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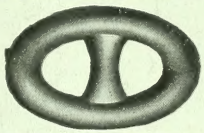

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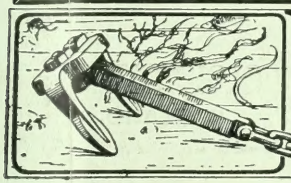

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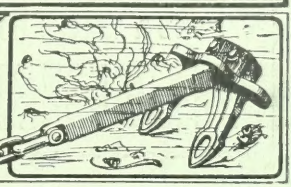

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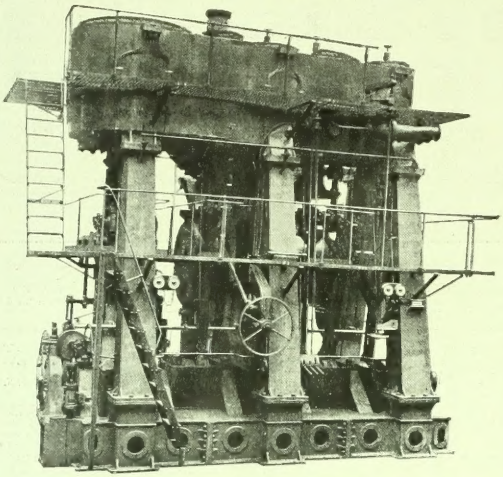

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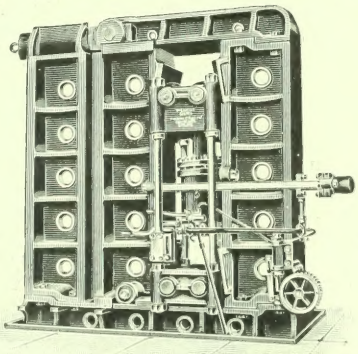

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Shipbuilding Problems.

VARIOUS aspects of the shipbuilding problem are frequently arising in the House of Commons. Questions have been put during the past week on the policy of extending private yards and on the resignation of the Shipbuilding Advisory Committee. The first topic has a very practical bearing on the question of national yards, because if private yards are greatly expanded the need for the State enterprise is correspondingly diminished. It appears that shipbuilding firms have applied for the grant of facilities for the construction of 74 new slipways. Forty additional slipways and the lengthening of three existing ones have already been sanctioned, and the remaining applications are under discussion. As to the resignation of the Advisory Committee, there was some disposition to get a declaration from the Government as to the cause. "I dare say," remarked Dr. Macnamara, "that in the great expedition under which the Controller and the Deputy Controller of Auxiliary Shipping had to move forward in getting new tonnage, there were not all those consultations which would otherwise have been held. That might very well be the case. The whole incident is happily closed now by the fact that these gentlemen have agreed to place their services at our disposal as members of the council under the chairmanship of the Controller." Perhaps the incident is susceptible of description in language not so favourable to the official view. The consultations which were omitted would have been on matters on which the Advisory Committee ought to have been consulted. We dealt with that last week.

Inland Ports.

When dealing recently with the subject of the development of canals, we pointed out the importance of the ship canal as a means of converting inland towns into virtual seaports, whereby the raw materials essential to the maintenance of the essential industry of the town and the surrounding district were brought direct from overseas with the minimum loss of time due to transfer from vessel to rail and overland transit, and consequently at a reduced rate to the manufacturer. The biggest of our inland ports—Manchester—is now apparently feeling the real benefit of the Manchester Ship Canal. Speaking at the meeting of the Port of Manchester Warehouses, Ltd., Mr. Marshall Stevens was able to show that, as a result of the war, the port of Manchester was coming into its own. A considerable proportion of the Australian wool supplies was recently taken to the port, and large quantities of tea destined for the North of England are now being handled there, thus relieving the strain on the railways. Mr. Marshall Stevens had something to say about an alleged avoidance of the port by the shipping lines owing to Conference arrangements, but whatever may have been the case in the past, it is to be hoped that now that economy in transport is of the utmost importance, the claims of Manchester and of every other port will receive the fullest possible consideration.

Standard Wages for Seamen.

We referred in this column recently to the decision of the Shipping Controller to fix standard rates of wages for the officers and men of the Merchant Service. The first list of standard rates of pay has now been issued, dealing with the wages of seamen and firemen on monthly articles, and they range in the deck department from £11 10s. per month for able seamen to £14 per month for carpenters, and in the engine room from £12 for firemen to £13 for donkeymen. The rates of pay for ordinary seamen and trimmers have yet to be fixed, but the figures already published show that the National Maritime Board, whilst they are not in any way guilty of extravagance cannot be condemned for the lack of generosity in their findings. In view of the fact that the usual rates from London for able seamen and firemen were £5 10s. and £6 per month respectively, it will be seen that the rates of pay are now nearly doubled, which compares very favourably with the proportionate increase obtained by workers in other branches of industry who have, in far greater security, adopted less constitutional means for forcing up the rates of pay. It should be noted that although officers are not included in the determination now announced, they are fully protected, regarding the new rates which are about to be fixed, by the retrospective clause in their articles, so that they suffer nothing by signing on at their existing rates of pay.

The P. & O. Accounts.

Many circumstances combine to rob the accounts for the financial year of the Peninsular & Oriental Steam Navigation Company of much of their pre-war interest. The effect of the war and the accompanying requisitioning of the whole of the Company's vessels by the Government makes it necessary to issue the accounts in a simplified form. Details of the amount of passenger income, freight receipts, gross earnings, fleet depreciation, are not given, whilst in comparing the balance to the credit of net revenue with previous years, allowance has to be made for the distribution in respect of stock issued to the shareholders of the New Zealand Shipping Company, and also for the dividend and bonus now

payable to the shareholders of the Union Steamship Company of New Zealand. The credit balance, before allowing for these deductions, is returned as £790,643, an increase of £120,997. The payment of the same rate of dividend and bonus on the deferred stock as last year (18 per cent.) leaves a balance of £92,712, being an increase on last year of only £7,383. The earnings of the company may, therefore, in the absence of any further figures, be estimated to have been almost the same as for 1915-16, and they provide a practical reply to those publicists who are for ever prating of the exorbitant profits made by shipping companies. The distribution to the shareholders only represents a modest increase of 3 per cent. on the pre-war distribution from 1912 to 1915 of 15 per cent. It is mentioned that the company's fleet has been reduced by several steamers during the year owing to enemy action, and some light is shown upon the recent purchase of the Nourse Line of six steamers by the directors' remark that the line was a valuable trade in the East, which will work in well with the British India services.

Renewal Rates on Foreign Steamers.

A certain amount of dissatisfaction is being expressed in underwriting circles concerning the terms on which the policies of steamers other than British are being renewed. It will be remembered that all British hull insurances are subject to a rise in premium of 10 per cent. on renewal. Why this does not apply to the vessels of other countries it is difficult to say, but in several cases insurances have been placed on the same terms as last year, on the pretext that being foreign owned the agreement does not apply. To us it seems that this is placing the British owner at a disadvantage, and it should not be difficult to obtain unanimity in the market on this ground alone. Nor are the practical reasons for demanding a rise in premium any less urgent in the case of foreign vessels. Repairs abroad have risen in an equal degree with those at home and casualties are no respecters of nations, while the increased dangers of navigation affect all who use the seas. It is to be hoped that the market will take a firm stand in this matter and insist on vessels of all nationalities being insured on equal terms.

New Government War Insurance for Coasters.

The new Government scheme for war insurance on cargo for coastwise voyages shows several developments. The principal one is the method of administration, by which the owner is made the insurance broker. On receipt of instructions from the shipper he is to stamp the following clause on the bill of lading, or parcel receipt:—"War risk covered by the Government war risk office, value to be the same as in the marine insurance policy." Then he is to collect the premium and forward it to the Government office on the sailing of the vessel, together with the necessary particulars, thus saving a great deal of clerical labour as compared with the placing of the risk through a broker. The stamping of the clause on the bill of lading is an excellent arrangement, doing away with the difficulty which has existed in the past through the uncertainty of ascertaining whether the goods had been shipped on a certain vessel till after she had sailed. The rates are in three categories:—5s. per cent. covers an area enclosed by a line drawn from the Clyde to Londonderry, and from the Bristol Channel to Dublin; 7s. 6d. covers the West Coast not south of the Bristol Channel and not North of the Clyde, to the east and south coast of Ireland, south of Dublin but not north of Cork. All other voyages, coasting round Great Britain and Ireland, are covered at 10s. per cent., and this last will result in many cases in a considerable saving, as voyages included in these limits have been rated considerably higher in the open market of late. The other rates are practically market rates, but the ease with which cover can be obtained makes all three rates in the schedule advantageous.

Missing Steamers. A New Development.

A new development in the missing-vessel problem has recently made its appearance as an outcome of the new arbitration scheme. The insurers, recognising that to keep the owner waiting for his money for a considerable period was unfair, decided among themselves to reimburse him the amount of his loss, each set of policies paying their quota. At the same time an agreement was formulated by which it was arranged that when the case had been decided by arbitration, the amounts paid by each set of insurers should be adjusted on the basis of the arbitrator's award; thus, presuming 50 per cent. to have been paid on each set of policies in the first case, and an award of 30 per cent. war risk and 70 per cent. marine risk to have been made by the arbitrator, the marine underwriters would adjust matters by a payment of an additional 20 per cent. to the war underwriters. The scheme has much to recommend it, not only from its fairness to the owner but also for its simplicity. We imagine, however, that not every case will lend itself to this method of adjustment.

Shipping in War Time.

The Ministry of Shipping has so many critics who attack it from so considerable a number of angles that it probably is not easy for the average man of shipping interests and no particular bias to be quite fair to it. Our own inclination, in regarding its work as a whole, is to draw a clear line between the State's financial policy towards shipping and the Ministry of Shipping's organisation of the industry and administration of its affairs. As our opinion of the State's financial policy is not obscure, we do not repeat it. It occurs to us, however, to suggest that in dealing with the emergency organisation of shipping many critics forget one or two rather important considerations, which in common fairness to the Controller ought not to be left out of account. It may be true, for instance, that an experienced owner or group of experienced owners, could, if left to himself or themselves, avoid some of the wasteful itineraries which are said to be common. It is also possible that by showing a keener appreciation of the difference between deadweight capacity and measurement capacity, he, or they, could make more economical use of the available tonnage. But, in justice to the Controller and his colleagues, it ought to be remembered that they are not administering the affairs of a company or of a conference, but the affairs of the whole British mercantile marine—organised for the purposes of the greatest war in history. The calls for tonnage are necessarily in very many cases sudden, and they have to be complied with at once. The conditions are, in fact, altogether abnormal, and they justify, to some extent, at any rate, the argument that the test usually applied by critics—the test which business men apply when conditions are normal—is the wrong one.

Shipbrokers' Commission.

Many of the relations of the shipbroker to the owner and charterer have been built up on a basis of usage. Mr. Justice Bailhache, in the case of Harley & Co. and others *v.* Nagata, has just judicially held that there is an established custom of trade that chartering brokers' commission is only payable in respect of hire actually earned. Once a custom of this kind is established, it is read into a contract unless it be expressly negatived. In the particular case under review the plaintiffs, who were shipbrokers, were instrumental in effecting a twelve months charter for the owners of the *Nagata Maru*. Let it be noted that the negotiations initiated by the brokers had ended in a contract. The charter party, which was made between the owners and charterers, and to which the brokers were not parties, set out that a commission of 5 per cent. on the estimated gross amount of freight or hire was due to the brokers, and might be deducted from each payment of hire, ship lost or not lost. The ship was actually lost before she came on hire. The shipowners sued for payment of £6,006 as commission on the agreed rate of

5 per cent. on the total hire. It was held in accordance with custom that the broker's commission was only payable in respect of hire actually earned, and the claim failed. Mr. Justice Bailhache remarked that custom would prevail even when the charter party expressed the commission to be due on the signing of the charter party.

Shipping Losses.

Vessels which are damaged by German U-boats, but not sunk, are not included in the published weekly returns. The official reason ascribed for this omission from the record is that many of the damaged vessels come back to service after repair. We are not furnished with statistics on this point, which has, however, some relevance to the shipping situation. Dr. Macnamara, the Secretary to the Admiralty, was asked in the House of Commons whether any record was kept of the ships which had been mined or torpedoed and reaching the shore had become total wrecks. He replied that he imagined that was the case, but he rather indicated that there were not many cases of the kind. A comment has been made in Parliament that information on this subject would be much more interesting than figures as to the vessels unsuccessfully attacked. On another aspect of loss of merchant tonnage, more precise information has been given by Dr. Macnamara. In the first 10 months of this year, he states, 20 British merchant vessels of over 1,600 tons were posted as missing. It is considered probable that three of them were sunk by mine or submarine.

The Shop Steward Again.

From the point of view of Trade Unionism the Coventry trouble over the recognition of Shop Stewards' Committees is distinctly disquieting. Whether employers should, or should not, negotiate with bodies of the kind is not really a question calling for consideration, seeing that under their agreements with the trade unions they are not bound one way or the other. The point raised every time a shop steward or body of shop stewards claims the right to negotiate with employers is purely one of Trade Union organisation. A shop steward has no powers except those given to him by his District Committee which appoints him, defines the duties he is to discharge, and is responsible for his action. When a difference occurs in his shop the utmost he is entitled to do is to report. The task of discussing the matter belongs to the district officials of his society, and, eventually, if there is failure to agree locally, to the executive council. A fact especially to be borne in mind is that the rules which prescribe that procedure are not the work of any body of autocrats, but have the approval of the whole body of workers. When, therefore, shop stewards claim recognition by employers, as they did at Coventry, the interest which really suffers most is that of Labour itself. Employers may be put to great inconvenience by the strikes which take place, and the whole community may suffer a little through the holding-up of supplies of national importance. But from the point of view of the worker, the least desirable effect must be that Trade Unionism is discredited in the eyes of its own people.

The Production Expert.

In the carrying out of their Merchant Shipbuilding Programme, our American Allies have, it seems, evolved a new type of overseer, who is described as "production manager." His duty is to visit the yards and shops in the area throughout which his authority runs, in order to see that work is proceeding satisfactorily, and, if possible, to speed it up. At first sight, the idea seems to be excellent. On reflection, however, the opinion of United Kingdom shipbuilders will probably be that if it is adopted on this side of the Atlantic care must be taken not to be over sanguine as to the effects of its application. Even with a platoon of production organisers for each yard, no improvement in progress will be possible if workpeople are not provided in sufficient numbers and if supplies of steel and other materials are not adequate or delivered up to time. If labour and materials are not forthcoming to the necessary extent, the only effect of the activities of these super-inspectors will be to irritate shipbuilders, and, possibly, to accentuate delays. The speeding-up of shipbuilding here and in America really depends less on the men on the spot than it does on the men at the other end of the organisation. There is always a certain strong inducement to the contractor to be up to time with his job—an inducement of which shipbuilding readers are in no need to be reminded. At the moment, with the control of labour and material out of his hands and in the hands of the State, this inducement is necessarily less effective. But it will be comparatively easy to stimulate it, we believe, without slavishly following the American example.

Germany's Submarine Production.

Various figures have been stated at different times as to the number and size of the submarines now being built in Germany. Some information on this point was given by Mr. Marley Hay in a paper on "The Influence of the War on Submarine Policy," read last month before the American Society of Naval Architects and Marine Engineers. Mr. Hay seems to have been in a position to form a close estimate of what our enemies can really do in this direction. The statement that Germany had no fewer than 700 submarines in May of this year, and that 1,200 would be in commission by the end of the year, he discredits. On the assumption that all the shipyards in the country were utilised for the production of these nefarious craft, and that no mercantile shipbuilding or repairs to the battle fleet were undertaken, which, of course, is far from being the case, Mr. Hay estimates that not more than 100 submarines could be completed every six months. Information to hand indicates that the actual recent output has been approximately ten per month, of which the great majority are in the neighbourhood of from 800 to 1,000 tons displacement. With regard to the construction of the so-called submarine cruisers, Mr. Hay states that these are eight in number, of 2,800 tons displacement, and mount two 6-in. guns. Three are reported completed, and the remainder will be ready by February. Whilst the ability of Germany to build a large number of submarines of great power and endurance is granted, that our fleet, with the aid of those of our Allies, will overcome their menace we have no doubt.

Control of Metal Supplies.

The Non-Ferrous Metal Industry Bill, which was before Parliament on Monday last, is of the greatest importance to the future of the shipbuilding and the marine engineering industry in this country. The measure seeks to eliminate enemy influence from the control in this country of such metals and ores as zinc, copper, tin, lead, nickel and aluminium, the reason given for the introduction of the Bill being that there is in existence a German combination for the control of the metal trade of the world. The Bill proposes to make it unlawful during the war, and for five years afterwards, for any company or individual to deal in non-ferrous metals without a licence from the Board of Trade. But why, it will be asked, is not the Bill made applicable to iron and the ores of iron? The reason is, undoubtedly, that the ores of iron are found in abundance in this country, and in time of war we are not threatened with any stoppage of the supply of this essential metal. But there are many of the rarer metals utilised in the production of steel, the supplies of which had been allowed to drift entirely into enemy hands, and owing to lack of initiative on the part of our manufacturers, many ores produced within the Empire were sent to Germany, where the commercial metal was produced. This new measure, coupled with the work of the Committee which is enquiring into the mineral resources of the Empire,

should do much to assure for the shipbuilding and engineering industries of this country, a cheap supply of steel, brass and other metals, so essential to their successful development against foreign competition.

THE REPLACEMENT OF TONNAGE.

THE offer of certain Norwegian shipping firms to place large orders at high prices for vessels to be built and delivered by British shipbuilders after the war has raised the important question of the position of the shipbuilding industry after the war. That considerable diversity of opinion exists on this question is proved by the fact that whilst certain firms have refused to book such orders, others, no less patriotic, have done so, acting, doubtless, on the belief that when the Government control of the yards is removed, it will be to the advantage of both the firm and the nation at large for such work to be put in hand. But what measure of control will be exercised by the Government after the cessation of hostilities? The Parliamentary Secretary to the Shipping Controller, Sir Leo Chiozza Money, in reply to a question, has stated that some form of control over the output of British yards must continue to be exercised after the termination of hostilities, but the principle upon which it will be exercised will necessarily depend upon the circumstances prevailing at the time. Already the form in which the necessary powers should be obtained is engaging the attention of the legal advisers of the Department concerned. It will be of interest, therefore, to consider the most probable trend of developments in the shipbuilding industry after the war.

The first problem, and a problem of the greatest urgency, will be to make good the ravages wrought both directly and indirectly by the war in British shipping. These are so great that many years of work is waiting to be done, and for the period immediately following the cessation of hostilities, British shipbuilders will have to concentrate on the restoration of the British mercantile marine to its pre-war position. After that period they should be free to undertake foreign work, for it is clearly in the interests of the nation that the supremacy of the British shipbuilding industry shall be maintained, and, if possible, increased. Two questions, however, remain to be solved before we can rightly judge the action of those firms who have accepted contracts for foreign orders; firstly, for what length of time after the war will the Government continue to control the shipyards; and, secondly, considering the shipbuilding resources of the world as developed by the war, how long a period may be expected to elapse before the present shortage of tonnage is made good.

With regard to the first question, it is apparent that the Government must continue to direct shipbuilding activities, in order that the whole energy of our shipyards is directed towards making good the losses suffered by our own merchant fleet. Neutral shipowners have been making large profits as a result of the war, and they will be willing to place orders in British yards, at prices which, in view of the control exercised over the shipping industry in this country, and the effect of the excess profits tax, British owners will not be in a position to pay. It appears necessary, therefore, that the Government should continue to direct shipbuilding until the British mercantile fleet has been restored to such a position that it can compete with equity against foreign fleets.

The second question which we have set ourselves to answer, demands for its solution a review of the shipbuilding position as we find it to-day. Taking Great Britain and the United States of America as the two greatest shipbuilding countries of the world, we have seen a definite goal set up in each country as marking the amount of tonnage which it is necessary to turn out. Thus, in this country, it has been stated that it is necessary for us to build at the rate of 3,000,000 tons per annum, and Sir Joseph Maclay has stated that it will be necessary for the United States to turn out ships at the rate of 6,000,000 tons per annum. In addition, shipyards in every other country of the world, whilst not approaching these colossal figures, are building at a rate which is far greater than before the war. It must not, however, be assumed that the figures quoted above will be reached in either country; already in America it is found that the rate actually achieved is far less than it should be; but the fact remains that steps are being taken to put down plant capable of building ships at such a rate that the shipbuilding output of the world cannot fall far short of 10,000,000 tons per annum.

At the present time, one thing which prevents rapid production is the difficulty of obtaining supplies of steel. After the war, when the demand for munitions will be very considerably reduced, far greater supplies of steel should be available for the purpose of building ships. Moreover, labour, displaced from munition making and other engineering work connected with the war, will tend to drift into the shipyards where work is to be found, and it is safe to say that, due to these two important factors—the supply of labour and of material—together with the inertia possessed as a result of its present activity, the shipbuilding industry will continue to produce tonnage at approximately the same rate as now.

It would thus appear as though the time which must elapse before the losses are made good, at least, as far as cargo-carrying vessels are concerned, will not be so great as many people are inclined to think, and that the time will arrive, not very long after the conclusion of hostilities, when those firms who are in a position to do so, will be able to turn their attention from the construction of cargo boats to liners. In addition, it will rapidly become possible to open the yards to the acceptance of foreign orders to the benefit, both of the shipbuilding industry itself, by tending to maintain our shipbuilding supremacy, and to the country as a whole by its beneficial effects on the foreign exchanges.

PICKLING SHIP STEEL.

THE preparing, or "pickling" as it is called, of ship steel is becoming more common. Whatever compounds may be used for coating steel, it is very necessary that the mill scale should be thoroughly cleaned from the plates and bars beforehand. The British Admiralty specify the removal of this by immersing the steel in a bath of dilute hydrochloric acid which contains one part of acid to nineteen of water. After remaining in some time the steel is taken out, hosed with fresh water and scrubbed with steel brooms. The material is then coated with linseed oil and allowed to stand in the weather for some days afterwards. In merchant work this has usually been considered an unnecessary expense, the usual practice being to put the material together without removing the mill scale and allow it to rust up. This rusting process is going on while the ship is on the stocks and until she is ready for painting. The rust and mill scale is then scraped off and the paint applied. The underwater portion of the ship is not painted before the launch and the sea-water accelerates the rusting up, with the result that when the vessel is placed in dry dock a very good surface can be obtained for the application of the anti-corrosive paint.

In a paper read before the American Drop-Forge Association, mention was made of the three principal methods for cleaning the forging, namely, pickling, tumbling and sand-blasting. The pickling is much better than sand-blasting. In the former method all surfaces are cleaned thoroughly from oxides or foreign substances which are detrimental to the machining operation, while in the tumbling and sand-blasting fine sand is hammered into the surfaces. This has a big effect in the machining operation, the cost of machining being three or four times as great with a forging cleaned by sand-blasting as in a pickled forging. In addition, drop forgings that have small holes or indentations are not cleaned properly except by pickling. It has been found that

the additional cost of pickling is more than offset by the saving in the cost of machining.

It is not uncommon to find nowadays merchant shipowners specifying that the steel used in their ships should be pickled. It is well known that the rusting-up process is not absolutely effective, and the extra expense involved in the pickling is probably easily saved in the less amount of corrosion occurring and consequent smaller upkeep cost for renewal of steel. At the present time there is another strong argument in favour of pickling. Ships are rushed through very quickly and, if possible, dry-docking near or on completion is dispensed with. This means that the bottom of the vessel has to be properly painted before leaving the stocks, and it is very doubtful if the rusting-up process has gone far enough to ensure a good application of the paint. In such cases, therefore, it is better to be on the safe side and pickle the steel before erection.

GERMAN OIL SUPPLIES FOR SHIPPING AFTER THE WAR.

FUEL oils of various densities—from the light spirit used in automobile and aeroplane engines, to the heavy oil used in submarine engines, and the heavier fuel used in oil-fired surface vessels—have played a vital part in the present war, and their importance will hardly be less when international traffic is restored after the war. The problem is of interest to every maritime nation, but to Germany it has the special interest that fuel oil may compensate to a great extent for the disability under which that country will operate in having no coaling stations abroad.

In speaking recently at Bucharest concerning the importance of the Roumanian petroleum industry, Georg Spiess gave some interesting data concerning the increased radius of action of future merchant vessels. The heat value of the best Roumanian fuel oil is about 19,800 British thermal units per lb., compared with 14,400 British thermal units for Cardiff coal and 13,500 British thermal units for Westphalian coal. Also, the energy stored in Roumanian oil may be utilised in a Diesel engine about four times more efficiently than by a steam boiler and engine or turbine combination. The weight of the steam equipment may be anything up to five times that of the oil-engine equipment. Spiess estimates that in future an 8,000-ton vessel, leaving Hamburg or Bremen with 700 tons of oil, will be able to go to Japan and back without re-fuelling. A similar steamship starting with 650 tons of coal would have to replenish the bunkers at Port Said, Colombo, Singapore, and in Japan. Spiess said "This represents an important advance in independence of English trickery and competitive methods in relation to German overseas shipping, and gives an enormous increase in the radius of action and a saving in space and time which will play an important part in the reconstruction of our mercantile marine." The question is, however (according to Dr. Hansen, in *Hansa*), whether Germany is so independent in respect of fuel oil supplies that she can reap full benefit from the advantages mentioned above.

In 1913, the latest year for which statistics are available, Germany used about 10 per cent. of the world's production of petroleum (50 million tons). Only about 140,000 tons (less than one-third of 1 per cent.) were produced in Germany, and none of the old German colonies had any known sources of petroleum. England was deriving considerable quantities of petroleum before the war from Burmah, Borneo, and Trinidad (British India alone contributing 2 per cent. of the world's production in 1913), and, in addition, had valuable contracts and concessions in Persia, Mesopotamia, Roumania and Mexico. The only European countries producing petroleum in quantities exceeding their requirements are Austria-Hungary, Russia, and Roumania. On the northern and eastern slopes of the Carpathians, in Galicia and the Bukovina, Austria-Hungary produced 1,087,000 tons of crude oil in 1913 (2,150,000 tons in 1909) equal in quantity to Roumanian oil. Russian production has fluctuated in quantity with political events and is capable of great increase. The production in 1901 was 11·1 million tons of crude oil, falling to 7·3 million tons in 1905 owing to the revolution, and rising to 9·2 million tons in 1913. (*Cf.* 9 million tons for America in 1901 and 32·3 million tons in 1913.) The Russian oil is very suitable for Diesel engines, and if Constantinople remains in Turkish hands there will be a strong incentive for Russia to export oil to Germany via the Danube or via the Volga-Marien canal, Ladogasee-Petrograd. Oil from Baku will come first into consideration for German consumption. Crude oil from Grozny is not very suitable for Diesel engines, but this district yields much benzine, and there are other regions in this part of the Russian Empire capable of much development.

"We have the highest hopes and expectations of receiving good power-oil from Roumania," says Dr. Hansen. German capital was largely interested in Roumanian oil wells before the country was occupied by the enemy, and the annual production of crude oil rose from 384,300 tons in 1904 to 1,885,387 tons in 1913 (3·77 per cent. of the world's production). Spiess estimates the production for 1914 and 1915 to be 1,783,947 tons and 1,673,145 tons respectively. The total value of petroleum exports from Roumania in 1913 is estimated officially at £3,710,000. The total exports of oil suitable for Diesel and similar engines amounted to nearly 300,000 tons (about 38 per cent. to England, 22½ per cent. to Italy, and 14 per cent. to Austria). Benzine exports amounted to nearly 250,000 tons (about 34½ per cent. to France, 31 per cent. to Germany, and 13 per cent. to England).

In future, Austria, Russia and Roumania will play a most important part in supplying oil to the Central Powers and in particular to German shipping. Formerly, it cost about 25s. 6d. per ton to send oil to Hamburg by sea, via Constanza, compared with 29s. 8d. per ton for the Danube route via Giurgiu to Regensburg. Hansen states that in order that oil may be received by the Central Powers free from English influence and control, transport on the Danube must be reorganised. By using motor tank-vessels of different draughts and providing transhipment stations on the lower Danube, at the cataracts and at the beginning of the middle and upper Danube, the cost of river-borne oil would be reduced by 7s. per ton and thus made cheaper than that taken by sea.

Supposing that all these expectations be realised, it is still not clear how German vessels which have to be supplied with oil carried right across Europe are going to compete with similar vessels which are able to take on fuel at the oil ports themselves, or at oil stations on shipping routes and near the oil centres of the world, all of which must remain in the possession of the Allies.

PUBLICATIONS RECEIVED.

[*A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.*]

Diesel Engine Design.—By E. Mortimer Rose, M.Sc. (Dunelm), A.M.Inst.C.E. Manchester: Emmot & Co., Ltd., 65, King Street. London: 20, Bedford Street, W.C. 204 pages, with numerous diagrams and tables, and six folding plates. 8¾ in. × 5¾ in. × 1 in. Price, 5s. net.

Although many books have been published on the Diesel engine, these have all been concerned more or less with the fundamental principles underlying the operation of this type of engine, and with detailed descriptions of actual engines by different makers. The development of this type of prime mover has been so rapid—and it bids fair to be even more rapid in the near future—that it is safe to say that many engineering firms will be earnestly considering the advisability of producing Diesel engines, and their decision will depend to a large extent upon whether they have upon their staff men capable of designing engines of this type. But very few of the text-books upon the subject deal prominently with the questions of actual design, and it was with a view to remedying this defect that the present volume was written, *i.e.*, so that draughtsmen

and designers might have placed before them the peculiar problems which arise in the design of the Diesel engine.

The fundamental principles underlying design have their foundation in the realms of science, and hence the author has been compelled to devote a portion of his space to a discussion of the principles of thermo-dynamics; the working fluid in internal-combustion engines; the four and two-stroke cycles of operation, and other theoretical considerations, a knowledge of which is essential to the designer. The double function of providing data and rules for drawing-office purposes, and serving as a treatise for engineering students, is thus in some part accomplished.

After an interesting introduction, dealing with the importance of the Diesel engine, and the various types manufactured, there follow four chapters on the theories of thermo-dynamics and the behaviour of the working substance in the cylinder, after which the next eight chapters are devoted to the design of the various parts of the engine, such as cylinders, bed plates, valves and cams, the scheme being to indicate the theory of the subjects dealt with, showing the practical application, and in many cases exemplifying this with actual illustration from current practice. In view of the important part played by the air compressor in the running of Diesel engines, the theory and design of this auxiliary forms the subject of the next chapter; whilst a special chapter is devoted to the subject of testing, the various commercial tests being enumerated and explained.

The final chapter deals with current practice, and consists of descriptions of well-known makes of Diesel engines, such as the British Westinghouse and the Krupp, whilst, as illustrative of marine Diesel practice, the "Polar" type, as built by Swan, Hunter and Wigham Richardson is described. This chapter is illustrated by six folding plates, giving sections of the engines described, and these should prove a valuable feature of the book, as indicating to designers the trend of modern practice.

The book is well got up, the diagrams clear and well drawn, and every attempt has been made to render the text simple and easy to follow. We venture to predict that in view of the extremely reasonable cost, this book will meet with a large sale, and we can recommend it to all draughtsmen who are engaged in the design of Diesel engines.

TRADE PUBLICATIONS.

[Copies of any of the publications mentioned in this section will be sent on application to the firms by which they are issued.]

Reducing and Throttle Valves.—Cockburns, Limited, Cardonald, Glasgow, have just issued two very interesting pamphlets describing two different types of their famous steam valves, and both of which are protected under the D. Cockburn-MacNicoll patent. The first deals with an improved full bore reducing valve which by an ingenious automatic bye-pass arrangement gives the closest possible regulation for all demands. The pamphlet describes the design and action of the valve as well as the best way of overhauling and adjusting, and is illustrated by sectional photographs, whilst tables in conjunction with line drawings give the overall dimensions of the various sizes of the valve.

The second pamphlet, similar in every way to the first, deals with a positively controlled regulating throttle and emergency valve that has been specially designed for use where superheated steam is employed. The throttle gear is arranged so that it may be operated either by the governor or by hand as an emergency gear.

SILVER WAR BADGE FOR MERCANTILE MARINE.

The following are the revised conditions issued by the Marine Department of the Board of Trade:—

1. These conditions will govern the grant of the Silver War Badge to those eligible among masters, officers and seamen of British merchant ships (whether on Government service or not) in which the wages are paid by the owners.

2. The Silver Badge may be awarded by the Board of Trade to any master, officer or seaman coming within the definition in paragraph 1, who is incapacitated for service in the mercantile marine through—

(*a*) An injury resulting from any act of hostility by or against the King's enemies; or

(*b*) Illness or shock due to being torpedoed or under attack; or

(*c*) "Strain" due to war conditions, including cases in which the nervous, mental or physical strain of service at sea under war conditions has made the man unfit for further service at sea; or

(*d*) Some disease (*e.g.*, malaria or dysentery) resulting from employment on a ship on Government service in an unhealthy climate.

3. The badge may be granted if it is proved that a man has been unable to go to sea for at least six months, and if the Board of Trade are of opinion that it is unlikely that he can go to sea within the duration of the war.

4. The award of badges to naval ratings, or to masters, officers or seamen of the mercantile marine who are serving under special naval engagements in His Majesty's ships and auxiliaries and whose wages are paid directly by the Admiralty, or Ministry of Shipping, will rest with the Admiralty.

5. The War Risks Associations who administer, on behalf of the Board of Trade, the Government War Risks Compensation Scheme will forward to the Board of Trade in the prescribed form full particulars of any case in which they are of opinion that the conditions of paragraphs 1, 2 and 3 are complied with, and will recommend the grant of the badge in such case.

6. The decision, final in each case, will rest with the Board of Trade.

STANDARD WAGES FOR SEAMEN.

The Shipping Controller announced on November 23 that the National Maritime Board had held its first meeting. The deliberations of the Board have since been continued day by day, and the following standard rates have now been recommended to the Shipping Controller and confirmed by him:—

FOR SEAMEN AND FIREMEN ON MONTHLY ARTICLES.

Deck Department.

		£ s. d.
Carpenter	Per month	14 0 0
Boatswain	,,	13 0 0
Boatswain's Mate	,,	12 0 0
Lamptrimmers	,,	12 0 0
Quartermaster	,,	12 0 0
Able Seamen	,,	11 10 0

Engine-room Department.

		£ s. d.
Donkeyman	Per month	13 0 0
Storekeeper	,,	13 0 0
Leading Fireman (when carried)	,,	12 10 0
Greasers	,,	12 10 0
Firemen	,,	12 0 0

The rates of pay of sailors and firemen on weekly articles, finding their own food, will be £3 17s. 6d. per week, but rates of pay for other ratings on weekly articles, and also for ordinary seamen and trimmers on monthly articles have still to be fixed.

The rates named are inclusive of all bonuses and additions, and do not apply to vessels under 200 tons gross, or to vessels sailing under the share system. These, and other exceptional cases, including railway-owned vessels, will be separately considered.

The new standard rates apply to all men who have signed articles since October 6, from the date of signing. The Board is considering the case of men who signed articles previous to October 6.

Wages in the catering department have also been considered by the proper panel of the Board, and a provisional determination made for passenger liners. Deliberations as to cargo vessels are continuing, and it is hoped to publish the results shortly.

In the meantime the officers and men of any department not included in the determinations now announced are reminded that they are fully protected as to the new rates about to be fixed, by virtue of the retrospective clause in their articles, so that they suffer nothing by signing on at their existing rates of pay.

THE STABILITY OF FLOATING CRANE PONTOONS OF RECTANGULAR SECTION.

The designer of a floating crane pontoon, in his selection and adjustment of dimensions has to provide sufficient stability to limit the angle of heel to a small amount, under conditions of maximum load and outreach, three to five degrees being the limit of heel permissible in most cases. This question of stability is probably the most troublesome item in the design and in many cases involves a measure of trial and error work in the preliminary stages. Stipulations may be made by the prospective users of the crane regarding outreach, &c., which preclude the possibility of providing the necessary stability by virtue of breadth alone, unless modifications be made to the design and arrangement of the crane structure; this latter course being undesirable if the crane conforms to some standard pattern. Hence it is possible that the designer, having worked out an arrangement in which full advantage has been taken of the value of breadth, by making it the maximum possible under the circumstances, may yet find that the calculated angle of heel is greater than the maximum stipulated in the requirements. In such circumstances the provision of ballast is the only remedy, and it is evident that a ready means of ascertaining the precise effect on the angle of heel, due to adding a chosen quantity of ballast at any known height will be of interest and utility.

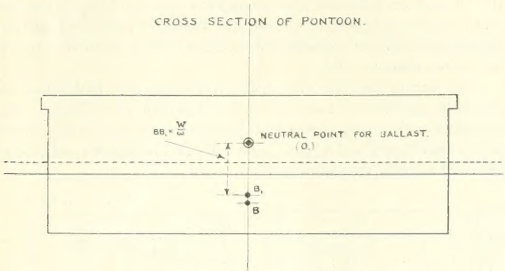


Fig. 1.—Section of Pontoon, showing Neutral Point for Ballast.

The following diagrams and figures show that there exists, for any chosen quantity of ballast, a "*neutral point*," such that if the ballast be located at that point the angle of heel will not be affected. In the case of rectangular vessels the position of the "neutral point" may be simply determined by considering only the change in position of the centre of buoyancy due to adding the ballast.

POSITION OF THE "NEUTRAL POINT" FOR BALLAST.

Fig. 1 represents a transverse section of a pontoon of displacement W when carrying full load, &c., but without ballast.

Let w represent a weight of ballast the effect of which is to be determined.

Let B and B_1 represent the position of the centre of buoyancy before and after adding the ballast w.

Then, for a vessel of rectangular section, it is obvious that the distance $B\,B_1 = \frac{1}{2}$ (increase in draught).

Set up from B_1 a distance $B_1O = BB_1 \times \frac{W}{w}$.

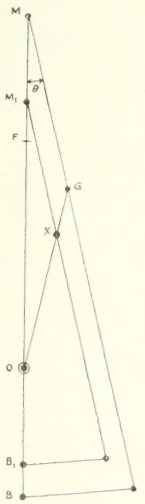


Fig. 2.—Diagram for determining Position of Neutral Point.

Then the point O is the neutral point for the ballast w. This may readily be shown by referring to Fig. 2.

Let a vessel of rectangular section and displacement W be in equilibrium with a small transverse inclination θ and let B and M be the positions of the centre of buoyancy and metacentre respectively.

Now assume that a weight w be added at some position on the middle line, such that the angle of heel θ remains the same and let B_1 and M_1 be the subsequent positions of B and M.

Suppose G be the position of the centre of gravity of the system before adding the weight w. Draw G O cutting the new metacentric vertical in X. Now if O is the point of application of the weight w and the angle of heel is to remain the same, then X, which lies on the new vertical, must be the location of the combined centres of gravity of W and w, that is,

$$\frac{GO}{XO} \text{ must } = \frac{W + w}{W}$$

Now the triangles M_1XO and MGO are similar, so that

$$\frac{MO}{M_1O} \text{ must also be equal to } \frac{W + w}{W};$$

$$\text{hence, } \frac{MM_1}{M_1O} = \frac{w}{W} = \frac{MF}{FB}$$

Where F is set down below M_1 so that $M_1F = BB_1$ it follows therefore that $\frac{MF - MM_1}{FB - M_1O} = \frac{w}{W}$.

But $MF - MM_1 = BB_1$ and $FB - M_1O = B_1O$,

$$\therefore \frac{BB_1}{B_1O} = \frac{w}{W}.$$

It follows also that the angle of heel is increased or reduced according as the ballast is added above or below the neutral point, the precise variation being easily obtained when the locations of the ballast and neutral point have been determined.

As an example, consider the effect of the angle of heel due to adding the ballast (w) at a known distance (y) below the neutral point.

Let the calculated metacentric height without any ballast be M, then, if the ballast be added at the neutral point, the metacentric height becomes $M_0 = \frac{M \times W}{W + w}$ the angle remaining the same.

Hence, if the ballast be added at a distance y below the neutral point this metacentric height is increased by an amount $\frac{y\,w}{W + w}$.

The final metacentric height will then be $M_y = \frac{(M \times W) + yw}{W + w}$

For the moderate angles under consideration it will be sufficiently accurate for practical purposes to take the angle of heel as being inversely proportional to the metacentric height.

The final angle then becomes $\frac{\theta \times (M \times W)}{(M \times W) + yw}$ where θ is the original calculated angle.

SHIPBROKERS AND REQUISITIONING OF SHIPPING.—In the annual report of the Institute of Shipbrokers the Council state that they have been actively engaged during the year in consolidating the position of British shipbrokers and in obtaining for them some amelioration of the situation created by the requisitioning of British shipping and the various restrictions imposed by the Government in the Allied interests on shipping generally. "It is satisfactory," the Council states, "to be able to report that the efforts made have succeeded to an extent which is quite appreciable in view of the difficulties encountered."

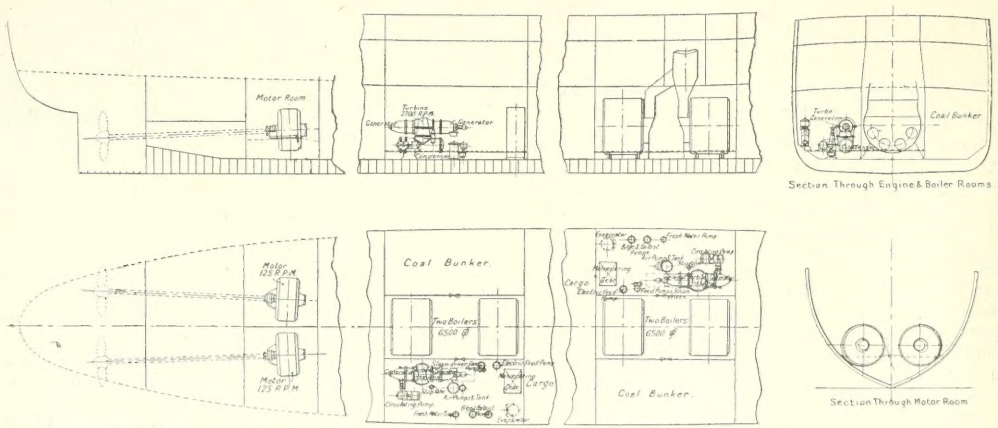
THE LJUNGSTROM TURBO-ELECTRIC SYSTEM OF SHIP PROPULSION.

The decision of the United States Naval Authorities to adopt a system of electrical propulsion for the large battle cruisers now under construction, has aroused considerable interest in the question of the use of electricity for the propulsion of ships. The advantages of this system of propulsion are well known, but it is thought by many that the double-reduction mechanical gearing gives a system equally advantageous which at the same time is free from the disadvantages of the electrical reduction gear. There are, however, limits to the ratio of reduction that can be obtained with the mechanical-reduction gear, even when this is of the double-reduction type, and hence, whilst the tendency of turbine design is towards the production of machines of higher speeds of rotation, a limit is reached beyond which the speed of the turbine cannot be run if mechanical-reduction gearing is employed and an efficient propeller speed is desired.

One of the most efficient turbines so far designed is the cating-engined ss. *Mimer*, and that comparative trials of the two vessels were carried out. These two sister ships, each of about 1,100 tons deadweight, were ordered in 1913 by the Stockholms Rederiaktiebolag Svea, the largest ship-running company in Sweden, for their home coasting trade. A proposal was made by the Ljungstrom Company that the Svea Company should fit one of the two vessels with their turbo-electric machinery, the Ljungstrom Company guaranteeing the following conditions :—

1. On trial the consumption per i.h.p. per hour of the electrically propelled vessel should not exceed 70 per cent. of the consumption per i.h.p. of the standard triple-expansion engine of the other vessel under equal conditions, excepting that the turbo-electrically-driven vessel should have the benefit of the reduction in weight of machinery as regards draught, and

2. If, during one year's trial, the Svea Company had reason to reject the machinery on account of loss of economy or efficiency, the Ljungstrom Company agreed at their expense to remove the turbo-electric machinery and replace same with a set of engines and boilers identical to those fitted in the other vessel.



Arrangement of Ljungstrom Turbo-Electric Machinery for Twin-Screw Intermediate Vessel of 21,000 tons d.w., 5,625 shaft horse-power, speed 13 knots.

Ljungstrom, a pure reaction turbine, in which the steam flows radially through concentric rings of blades moving alternately in opposite directions; the result being that whilst the velocity of alternate rings of blades relatively to each other is high, the speed of rotation is only half that of a turbine consisting of alternately fixed and moving rings of blades. Even so, in this type of turbine very high speeds of rotation are employed, the turbines rotating at 7,200 r.p.m., which is equivalent to a speed of rotation of 14,400 r.p.m. with the usual type of turbine. It is obvious that with speeds of such magnitude, although the employment of mechanical reduction gear is almost impossible, if an efficient system of speed reduction can be found, the turbine would prove itself to be most economical in use. Hence the Ljungstrom turbo-electric system of ship propulsion, combining, as it does, the economy of the high-speed Ljungstrom turbo-generator with the flexibility of the electric reduction gear, is the most economical system of ship propulsion at present known. Using this system in large units, it is possible to develop a shaft horse-power at the propeller for the expenditure of 8·5 lbs. of water, with steam at 600 deg. F.*

It will be recalled that the original Ljungstrom Steam Turbine Company, of Finspong, Sweden, fitted the turbo-electric propelling plant in the ss. *Mjolner*, a sister ship to the triple-expansion recipro-

The trial results of the two sister ships are given below :—

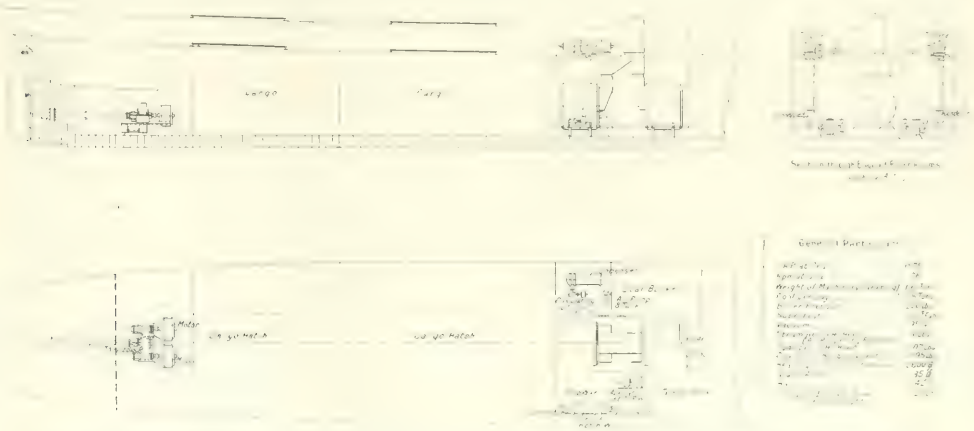
	SS. Mimer (Triple-Expansion Reciprocating Engines).	*SS. Mjolner* (Ljungstrom Turbo-Electric Plant).
Mean draught	11 ft. 9 in.	11 ft. 5½ in.
Displacement	1,698 tons.	1,648 tons.
Duration of trial	251 mins.	176 mins.
I.H.P.	849	981
S.H.P.	730	843
Speed of propeller, revs. per min.	87	88
Coal consumed per hour...	1,313 lb.	873 lb.
,, ,, ,, i.h.p. per hour	1·545	0·890
,, ,, ,, s.h.p. ,, ,, ...	1·798	1·036
Calorific value of coal	13,498 B.T.U.	13,485 B.T.U.
Percentage of moisture in coal	4·1	2·2
,, ,, ash ,, ,, ...	3·6	5·0
Speed in knots	11·3	11·8
Vacuum (barometer=30 in.)	26 ins.	29 in.
Boiler pressure, lb. per sq. in.	183	220
Feed temperature	180° F.	220° F.

The consumption of the *Mjolner* was thus 42·3 per cent. less than that of the *Mimer*.

The propelling plant of the *Mjolner* consists of two turbo-generators of equal power, delivering their power electrically to two motors, each motor drives a pinion engaging through helical gearing to a common wheel attached to the propeller shaft. Each turbo-generator consists of a standard Ljungstrom type double-rotation turbine attached to two independent three-phase alternating-current gene-

* Lieut.-Com. H. C. Dinger, U.S.N. The Machinery of Capital Ships. Journal of American Society of Naval Engineers, Vol. XXIX., page 90.

rators, one on each side of the turbine, the cylindrical turbine casings being mounted direct on the top of the condensers. The generators are designed to run at a speed of 7,200 r.p.m., and give three-phase alternating current of 500 volts at a frequency of 120 alternations per second, the maximum load being approximately 400 kw. per unit, *i.e.*, 800 kw. for the complete installation. The motors are of the standard commercial type of three-phase induction motors with slip-rings, designed for 120 periods per second, and running at 900 r.p.m. at 500 volts. The reduction of speed between motors and propeller shaft is 10 to 1.



Arrangement of Ljungstrom Turbo-Electric Machinery for Single-Screw Cargo Vessel of 7,000 tons d.w., 1,575 shaft horse-power, speed 10 knots.

As recording the relative consumption of the two vessels under actual working conditions, the following translation of a report from the Inspection Department of the Svea Company is of interest.

"The difference between the coal consumption of the ss. *Mimer* and the ss. *Mjolner* is extracted from the engine-room reports as follows:

"For the ss. *Mimer*: From January 20, 1915, to May 3, 1915, 4,450 nautical miles have been covered, and during the same period 361,000 kgs. of coal have been burnt.

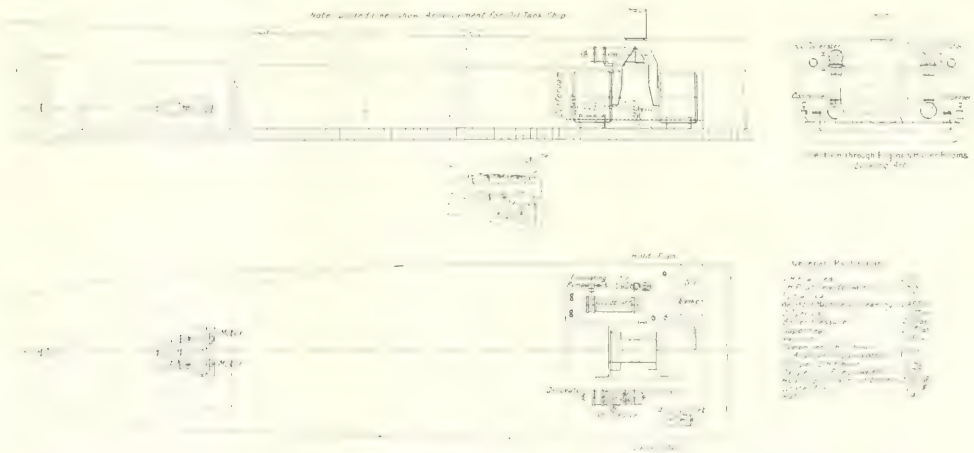
$$\frac{361{,}000}{4{,}450} = 81{\cdot}1 \text{ kg. per nautical mile.}$$

"For the ss. *Mjolner*: From January 31, 1915, to April 28, 1915, 6,378 nautical miles have been covered, and during the same period 319,780 kgs. of coal have been burnt.

$$\frac{319{,}780}{6{,}378} = 50{\cdot}14 \text{ kgs. per nautical mile.}$$

$$\frac{50{\cdot}14}{81{\cdot}1} = 0{\cdot}618 \quad 38{\cdot}2 \text{ per cent. less coals on } \textit{Mjolner} \text{ than on ss. } \textit{Mimer}.$$

Both vessels have during the said period been running in coasting trade and under similar conditions."



Arrangement of Ljungstrom Turbo-Electric Machinery for Oil Tanker of 7,000 tons d.w., 2,500 shaft horse-power when burning Oil Fuel.

The success which has thus attended the application of the Ljungstrom turbo-electric system to small cargo vessels has led to the preparation of designs for the application of the system to larger cargo vessels. These designs, which have been prepared by the

British Ljungstrom Marine Turbine Company, embody many improvements upon the original system outlined above, among which may be mentioned the placing of the electric motors right aft, thus giving greater cargo space, and permitting of a better subdivision of the vessel. Also, squirrel-cage motors are employed and, in certain cases, mechanical reduction gear between the motor and the propeller shaft is dispensed with, the motor being direct-coupled to the shaft.

The first drawing shows the arrangement of the machinery for a twin-screw vessel of about 21,000 tons displacement and 13 knots sea speed, where an equivalent of 6,250 i.h.p. is required. The machinery consists of two Ljungstrom turbo-alternators supplying three-phase current to two propelling motors, direct-coupled to the propeller shafts, which run at about 126 r.p.m. In order to secure the floatability of the ship under adverse circumstances, the machinery space is divided into eight watertight compartments, the propelling motors occupying two of these compartments aft and remote from the turbo-alternator and boiler compartments and the coal bunkers. The latter compartments are placed amidships, two being allotted to the turbo-alternators with their auxiliaries, two to the boilers and two to the bunkers. Each turbo-generator with its boilers and bunkers forms an independent group, and between the two groups are placed cargo holds of any desired length with suitable watertight bulkheads. The cables between the alternators and motors are carried along the deck and about the middle line of the vessel. These cables are independent for each motor, but are cross connected at a suitable position.

The boilers are of the cylindrical type arranged for Howden's system of forced draught and for burning coal as fuel. The heating surface is 13,000 sq. ft., boiler pressure 220 lbs., and total steam temperature 630 deg. F. The condensing plant is designed for a 95 per cent. vacuum. The whole of the above machinery weighs 830 tons "steam up," and is capable of developing power equivalent to 6,250 i.h.p. on a consumption of 60 tons per day of Welsh coal.

The flexibility of the turbo-electric system obviously lends itself to the most efficient sub-division of the ship into watertight compartments; thus, if one motor-room, one boiler-room with bunker, and one engine-room were flooded, the ship could still run at about 70 to 75 per cent. of her normal speed with the remaining machinery. In addition to the watertight sub-division, a further great advantage is the absence of shaft tunnel and the consequent increase in cubic contents of the after holds, together with greater ease in handling cargo due to the absence of these tunnels.

The following table illustrates the most important features of the system as compared with reciprocating engines; cylindrical boilers and superheaters being used for the turbo-electric system, and cylindrical boilers with saturated steam being used for the reciprocators.

Item.	Ljungstrom Turbo-Electric System.	Reciprocating Engines.
Coal per day, tons	64	96
Coal per i.h.p. hr. equiv.	0·96 lb.	1·44 lb.
Total heating surface	[illegible] sq. ft.	18,000 sq. ft.
Total grate area	[illegible] sq. ft.	1,200 sq. ft.
Weight of machinery (t.)	830	1,450
Weight of [illegible] boilers (t.)	1,200	1,500
Gain in deadweight, tons	[illegible]	—

The second drawing shows the arrangement of the machinery for a cargo steamer of 6,500 to 7,000 tons d.w., in which 1,750 equivalent i.h.p. is required to drive the ship at about 10 knots. In this case the boiler are placed in a separate watertight compartment on the mid-line of the ship with the two three-phase turbo-alternators on deck above the boilers and exhausting to the condensers, which are placed on the tank top level, and on either side of the boiler-room. By this arrangement, a considerable amount of cargo space [illegible] 40 per cent. of the machinery being operated even [illegible] the extreme ends of the hold both condenser rooms are open to the sea, [illegible] the turbine will automatically exhaust to atmosphere and the [illegible] can still be driven at reduced speed. The propelling motors are geared to the shaft through double helical single-reduction gear, and are placed in a separate compartment as far aft as possible so as to give the after holds greater capacity and allow cargo to be easier worked by the absence of the shaft tunnel. The following table shows a comparison between the Ljungstrom turbo-electric system and reciprocating engines of the standard type:—

	Ljungstrom Turbo-Electric Scheme.	Reciprocating Engine, Standard Type.
I.H.P., at sea	1,750 (equiv.)	1,750
S.H.P. „	1,575	1,575 (equiv.)
R.P.M., propeller, at sea	76	76
Weight of machinery	195 tons	345 tons
Coal per day (Welsh)	18 tons	28 tons
Boiler pressure	220 lb.	185 lb.
Superheat	230° Fahr.	Nil
Vacuum	28½ in.	26 in.
Steam, per i.h.p. hr.	9 lb.	15 lb.
„ „ s.h.p.-hr.	10 lb.	16·6 lb.
Coal per i.h.p. hr.	0·695 lb.	1·5 lb.
„ „ s.h.p. hr.	1·567 lb.	1·66 lb.
Heating surface	3,800 sq. ft.	5,350 sq. ft.
Grate area	85 sq. ft.	130 sq. ft.
Draught	Howden.	Howden.
Ratio	1 : 12⅓	1 : 41.
Coal per sq. ft. grate	20 lb.	20 lb.

The third drawing shows the machinery arranged in a manner similar to that in the second, but in this case the boilers are arranged for burning oil in the furnaces and motor-driven pumps are indicated for pumping the tanks, should the ship be designed to carry oil in bulk. The total propelling power at sea in this instance is 2,500 equivalent i.h.p. Apart from the direct advantage of the turbo-electric propulsion in this case, further gain is obtained by pumping the cargo oil by means of electrically-driven pumps. No extra generating plant is required, as one of the main propelling sets may be used for this purpose, running at one-third load, in which case the consumption is 14 lbs. per k.w. hour. The net result would be that the ship will be in port about 33 per cent. less time, and discharge about 60 per cent. more oil per hour at a total cost of about one-half, as compared with the ordinary steam-driven pumping system adopted in oil tank steamers.

In the three designs illustrated the propelling auxiliaries, steering gear and deck machinery are electrically-operated, and may be supplied with current from either of the main sets through static transformers, or from the auxiliary sets indicated. Manœuvring is entirely accomplished on the stop valve of the turbine, the speed of the propelling motors following speed of turbine in exact ratio. Reversing is effected by reducing speed of turbo alternators about 20 per cent., and then throwing over reversing switch on motors by means of a relay connected to the stop valve.

It is interesting to note that whilst the national demands for tonnage makes it impossible to embark upon the construction of large numbers of vessels of novel type, contracts have already been placed for 43 vessels to be fitted with the Ljungstrom turbo-electric gear, aggregating 78,250 h.p., and already some of these vessels are in an advanced stage of construction.

Fixing Rates on Government Cargo.—In a reply to Mr. McKinnon Wood in the House of Commons on Tuesday, Sir L. C. Money said: It is quite impossible to fix the rates on Government cargo so that they shall be the exact equivalent of the cost of carriage of any given commodity on any given route, but in as far as the factors are ascertainable we propose to fix such rates on Government cargo for each route as will correspond to the average cost of carriage over all voyages on that route. Despite the adoption of this principle in the fixing of Government cargo it remains quite probable that voyages on certain routes may from time to time be run at a loss or on another route at a profit and in that sense as well as because there are certain factors [illegible] incapable of detailed apportionment the Ministry of Shipping must treat its traffic as a whole. Only experience can show [illegible] loss, or a profit is made.

STEERING PECULIARITIES OF SHIPS. I.

The whole subject of the steering of ships forms a very fascinating study, and it is proposed, in the following articles, to draw attention to some of the most interesting points in connection with the steering of ordinary single and twin-screw vessels. To enable these points to be fully appreciated it may be well to first briefly indicate the actual manner in which the position of the rudder affects the direction of motion of a ship.

Assume a vessel fitted with a rudder at the stern to be moving ahead in a straight line, and at a moderate speed, by reason of some agency operating well away from the stern of the vessel, the rudder meanwhile lying in the fore and aft line of the ship. If now the rudder is put over so that it is at an angle to this line, the vessel will begin to move away from her original straight course, and if the rudder is kept over she will move in a path roughly approximating to a circle. This behaviour can be explained by discussing the variation in the form of the stream lines around the ship when the rudder is moved, but the most practical way of looking at the matter is to consider the rudder as a plane surface placed at an angle to the line of flow of a considerable volume of fluid, and therefore subject to a very distinct pressure due to its interference with this line of flow. Resistance to this pressure is afforded by the connection of the rudder to the ship, so that as a direct consequence of putting over the rudder a force is exerted on the vessel which does three things, viz. :—

(1) It pushes the vessel bodily in a broadside direction.

(2) It causes the vessel to swing round about a vertical axis.

(3) It retards the vessel and takes away from her speed.

(It is not generally recognised that (1) really occurs, but anyone interested can readily prove that it does, as a point can always be found usually well forward of the mid-length of the ship, about which it is apparent that the vessel is swinging while under helm.)

The pressure on a plane surface placed at an angle to the line of flow of a fluid will increase with an increase in the velocity of flow of the fluid and it will also increase the more the plane of the surface tends towards making a right angle with this line of flow. In the example taken above, care has been taken to consider the case of a vessel in which the propulsive effort is applied well away from the stern, so that the velocity of the water approaching the rudder is substantially the same as the speed of the vessel herself. Typical cases would be a very beamy paddle steamer, or a rowing boat, and it is obvious that in either of these cases the manœuvring power of the rudder depends almost entirely on the speed at which the vessel is moving.

In a single-screw steamer, on the other hand, with the rudder placed just abaft the screw, the action of the propeller is to throw a race aft at considerable speed, which race impinges more or less directly on the rudder. The result is that even with the vessel practically at rest, the starting of the propeller will enable her to be slewed while she has practically no headway. This is a matter of very considerable importance in the case of ships which have to be manœuvred in crowded waters, and which have to approach and leave jetties, although the provision of numerous warping bollards assists considerably in the latter direction. The effect of the propeller race is felt less if the engines are started "astern," as the efficiency of the screw is less, but even in this case a considerable amount of "steerage way" can be obtained while the vessel has little "sternway." By carefully watching the behaviour of the vessel, it is possible to turn a single-screw ship in a very small circle by taking advantage of the above facts, the screw being turned first ahead and then astern, so as to maintain considerable steerage way with extremely little head or stern way, while at the same time the rudder is put first to one side and then to the other in order to take advantage of these conditions.

The direct effect of the screw race becomes a matter of vital import when endeavour is being made to avoid collision. If the vessel is moving ahead, either with the engines still going "ahead," or with the engines stopped, the behaviour of the vessel, when the helm is put over, can be fully anticipated. As soon, however, as the engines are reversed and the screw begins to run "astern," it is experience only which will enable one to accurately estimate the effect of putting the helm to one side or the other. On the one hand the "ahead" movement of the ship will tend to turn the vessel to port if the helm is put to starboard, while, on the other, the effect of the screw race with the helm to starboard, and the screw running "astern," will be to tend to turn the vessel to starboard. A third factor, which is commonly neglected, needs also to be given due consideration, namely, the turning effect which a single screw exerts on a vessel when it is revolving even with the rudder amidships.

When a screw propeller is revolving in water there is a distinct variation in the pressure on any one blade, as it turns through a complete circle, due to the increase in hydrostatic pressure the deeper the blade goes below the surface. The pressure on the blade tangential to the circle described by it is greater when the blade is describing the lower half of the circle, than it is when the blade is completing the upper half of the circle. The result is that a vessel with a "right-handed" screw propeller, *i.e.*, a propeller which, when viewed from aft, rotates in a clockwise direction when driving the vessel ahead, will always need a little port helm to keep her on a straight course, the amount of helm necessary usually increasing the lighter the condition of the vessel. With the engines reversed, and the vessel running astern, a little starboard helm will be necessary to keep her straight. To avoid this effect in torpedoes it is usual to fit a right and a left-hand propeller of the same size and pitch, one mounted before the other, these propellers running in opposite directions.

Assuming a single-screw steamer to be driven by a "right-handed" propeller, it follows that the circle in which the vessel turns under, say 10 degrees of starboard helm, will be smaller than that in which she will turn with 10 degrees of port helm. Appreciation of the above will often prove of value under certain conditions.

Considering now the effect of this third factor in the case of a vessel being manœuvred to avoid collision, the following few remarks will indicate that this factor may have a very marked bearing on the behaviour of a vessel, more especially after the engines have been reversed. As already pointed out, the ahead motion of the ship and the race from the reversed propeller, have opposite effects on the rudder, while the slewing effect of the propeller itself further complicates matters. The question can be best explained by considering the forces acting in a particular case. Assume a vessel with a right-handed screw to be steaming ahead on a straight course, and at a moderate speed. Assume further, that the engines are suddenly reversed and the helm put over to starboard. The vessel is at once under the action of three distinct forces, *i.e.* :—

(1) A force tending to turn her to port, and due to the "ahead" motion of the ship.

(2) A force tending to turn her to starboard, due to the action of the race from the reversed propeller.

(3) A force tending to turn her to starboard, due to the rotation of the screw itself.

The first will rapidly decrease, with the result that the head of the vessel will quickly begin to turn to starboard, and continue to turn in this direction more and more rapidly as she begins to gather stern way. (This means, of course, that as she goes astern, the stern of the vessel will go over to port.)

Suppose, now, that the helm had been put to port instead of to starboard, other conditions being as before: the first force would tend to turn vessel to starboard, the second to do would tend to turn vessel to port; and the third force would tend to turn vessel to starboard.

In the second case, therefore, it is obviously possible for the vessel to be very much longer in beginning to move in the direction in which she will finally swing, as the screw race effect has not only

to overcome the effect of the ahead motion of the ship, but it has also to overcome the slewing effect of the propeller itself. If the screw be of coarse pitch and running half out of water, as often happens with vessels in ballast, it is quite possible that in this second case the vessel will be quite unmanageable with the helm to port, although she will answer starboard helm without difficulty.

The foregoing serves to emphasize the necessity of a master experimenting with his vessel when possible, so that he may be fully aware of her particular vagaries. Emergencies are bad times for experiments.

DIESEL ENGINE USERS' ASSOCIATION.

At the November Meeting of the Association, the President (Mr. Geoffrey Porter) reported that the Standing Committee on Insurance against Breakdown were drafting by-laws to regulate its procedure and to deal with differences that might arise between the underwriters and policy holders in the interpretation of the standard policy, &c.

The recent Order of the Ministry of Munitions regulating supplies of tar oil for use as fuel in Diesel engines was considered and discussed. Comment was made on the condition in the schedule that acceptance of the producers' weights and measurements in selling tar oil should be compulsory on the purchaser. It was reported that the Controller of the Mineral Oil Production Department of the Ministry of Munitions was arranging for trials of mixtures of pitch and creosote to be carried out with a view to their adoption for use as fuel for Diesel engines. The hope was expressed by the meeting that actual users of Diesel engines under normal working conditions should be given an opportunity of thoroughly testing any such fuel and reporting thereon before any final decision was arrived at by the Controller as to its suitability.

AN IRISH SHIPPING DEAL.

We understand that arrangements have been made by which the Ulster Steamship Company (G. Heyn & Sons, Managers, Belfast) has acquired the goodwill and the remaining tonnage of the Irish Shipowners' Company, Ltd. (Thos. Dixon & Sons, Managers, Belfast).

The Ulster Steamship Company, Ltd., is better known as the Head Line, and the Irish Shipowners' Co., Ltd., as the Lord Line.

The directorates of both companies consist of local gentlemen, several of whom, notably Sir Thomas Dixon, Bart., are largely interested in both concerns.

The Ulster Steamship Company before the war owned some 15 high class steamers engaged in the traffic from Belfast and Dublin to Montreal, Quebec and St. John, also New Orleans, and Galveston, and the Baltic ports. Several vessels are building for the company in Belfast, and another was completed a few months ago.

The Lord Line before the war owned nine steamers of an average of 4,000 tons, most of which were built in Belfast. The war has, however, made some changes in the composition of the fleets of both companies.

The Ulster Steamship Company has a capital of £300,000, and the Irish Shipowners' Company a capital of £400,000. These companies are the largest shipowning concerns in Ireland, and the completion of the transaction will mark the disappearance of the Irish Shipowners' Company as shipowners. Messrs. Dixon, however, have numerous other commercial interests and undertakings which will be continued, heretofore.

Developments in Shipbuilding.—It is stated that H. & C. Grayson, Ltd., shipbuilders and engineers, Liverpool, have purchased the extensive saw mills of Henry Quayle & Sons, at Canada Dock, Liverpool, and will carry on the business of sawing, planing, &c.

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS.

The members present at the annual meeting of the North-East Coast Institution of Engineers and Shipbuilders, held in Newcastle, last Friday, were informed that the balloting for the election of officers had resulted in the unanimous appointment of Mr. Edwin L. Orde as president, and the re-election *nem. con.*, of Mr. R. H. Winstanley as treasurer. The vice-presidents elected were Mr. J. T. Batey, Prof. R. L. Weighton and Mr. James Marr, and Mr. Geo. Renwick had been co-opted as a vice-president to fill the vacancy caused by Mr. Orde's elevation to the presidential chair. Messrs. Geo. Ainsworth, Wm. N. Bartram, Geo. M. Harroway, Archibald C. Ross, and W. J. Noble had been elected as members of Council.

It was announced that for the first time for about ten years the Institution's financial account showed a balance on the right side.

Mr. Winstanley stated that the increase in the revenue from transactions was accounted for by the larger demand, not only for recent numbers, but for older records, a demand which came not only from the United Kingdom, but from America and elsewhere. Endowment investments had increased by £578 to £5,756. The capital account now stood at £8,441.

Seconding a vote of thanks to Mr. Herbert Rowell, the retiring president, which had been moved by Principal Hadow, of Armstrong College, Mr. Arthur Scholefield, shipowner, said he did not think the work of such institutions was sufficiently appreciated by shipowners, merchants and underwriters throughout the country. All shipowners should support these institutions, because they were very largely indebted to them for the great improvements that had been made in vessels. The merchants should support them because these vessels were adopted for stowage infinitely better than were the old boats and their cargoes were carried and discharged in better condition. Underwriters also benefited by the great improvements introduced into ship construction.

The Presidential Address.

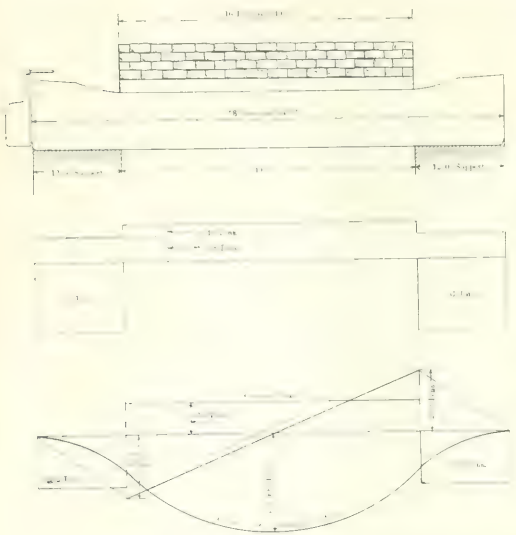
Mr. Edwin L. Orde (Messrs. Armstrong, Whitworth & Co.), in the course of his presidential address, remarked that the application of the principle of standardisation to ships presented no difficulties, and, while there might be legitimate discussion as to the best types and dimensions, the principle was one it was impossible to depart from if really rapid national production was required, and it was difficult to reconcile the criticism and opposition with an intelligent conception of war conditions. The propelling machinery of standard ships was naturally of the simplest design and construction, and would probably represent the staple product for marine engineers for some time to come. Mr. Orde dealt at some length with research, and said it was difficult to see the part which could most usefully be played by Governments in assisting it. Probably the liberal endowment of such institutions as the National Physical Laboratory, and the founding and endowment of such other laboratories as might be deemed necessary, would be the most efficient method for Government aid, but a stimulus to research might also be given if producers of new and improved apparatus were to submit their proposals to research committees such as that of the North-East Coast Institution, which would report to a scientific advisory committee and recommend grants. With regard to reconstruction after the war, he suggested that [illegible] were exercised in choosing works committees, and confine their operations to channels which would not interfere with the smooth working of existing trade-union organisation on the one hand and the existing management on the other, confusion and delay would arise, which would defeat all the objects of the Reconstruction Committee. In his concluding remarks he outlined a [illegible] work for the Institution, such as that of a [illegible] of the Employers' Associations on the North-East Coast and [illegible] to negotiations with education authorities, to put [illegible] and consulting as to the best methods of [illegible].

LOADING TEST OF A 100-TON DEADWEIGHT FOUGNER FERRO-CONCRETE LIGHTER.

The loading test of the above lighter was made recently in Fougner's Ferro-Concrete Shipbuilding Yard at Moss. The lighter was only supported at both ends so that for a distance of 40 ft. amidships there were no supports whatever, the length between perpendiculars being 64 ft.

In this position the lighter was loaded at the deck hatches with 190 bags of shingle, the total weight being 15 tons, and in addition there was the weight of 13 men, taken as one ton. After careful inspection of the lighter the inspectors of the Norske Veritas and the Norwegian Board of Trade found that, in spite of the considerable pressures and the bending moment from its own weight and the above-mentioned load, no weakness whatever was apparent. The surface of the ferro-concrete did not show any sign of cracking nor any indications of flaws of any kind.

The weight of the lighter was about 58 tons. During the trial the pressure was so great that the ground under the blocks dropped



Load, Shearing Force, and Bending Moment Diagrams for Ferro-Concrete Lighter.

about 4·5 mm. By deducting this from the readings of the deflection meters the deflection of the lighter in the middle was found to be 6 − 4·5 = 1·5 mm. The loading, shearing force, and bending moments are illustrated graphically on the above drawing. On this it appears that the maximum shearing force during the trial was 26·2 tons (at the mid-ship ends of the supports) and the maximum bending moment 190 ft. tons (at the middle of the lighter).

As a result of this trial the lighter was ready to be put in the water, with the exception of the outer polish on the middle of the after-part of the bottom. The ceiling in the hold was not laid, but the strakes and the hatch covers were in place. The concrete on the deck had been in place 50 days and on the sides 30 days. In service it will have a displacement of 162 tons.

LUNA DAMPFSCHIFFS A.G., TH. GRIBEL.—This company is now dissolved after maintaining service between Stettin and Danzig with the ss. *Luna* (585 tons) since 1880. A dividend of 12 per cent. was paid for 1916 on the capital of £10,700; and 3 per cent. was paid for the two preceding years.

THE FINANCIAL POSITION OF GERMAN SHIPBUILDERS.

The last financial year, 1916 or 1916-17, was again favourable to German shipyards. Most of them paid an increased dividend though in many cases limitations of working prevented an increase in net profits. Such limitations resulted in a corresponding reduction of expenses. Only in one case was there a reduced dividend, viz., Henry Koch (Lubeck), reduced from 16 per cent. to 7½ per cent. This reduction was principally due to the fact that the share capital of the undertaking had been raised from £29,400 to £147,000, whilst the new equipment for which this capital was obtained could not be utilised to any considerable extent during 1916-17. A dividend of 3½ per cent. was provided on the new capital. Most of the other yards have undertaken capital increases which are not yet fully productive; otherwise the dividends for the past year would have been still higher.

The following table shows the present capital of the principal German yards (an asterisk (*) denotes that the capital has been increased during the war); and also the dividends paid from 1912 to 1916 or, since the financial year in most yards is from July 1 to June 30, from 1912-13 to 1916-17:—

Yard.	Capital. £	Dividend paid for 1912 (1912-13) %	1913 (1913-14) %	1914 (1914-15) %	1915 (1915-16) %	1916 (1916-17) %
Blohm & Voss, Hamburg	980,000*	7	4	6	6	6
Vulcan Werke, Stettin...	735,000	6	0	6	8	8
Bremer Vulkan	490,000	10	11	11	11	12½
Atlas Werke, Bremen ...	367,500	6	7½	10	8½	10
A.G. Weser, Bremen ...	360,000	4	0	0	8	10
Howaldt Werke, Kiel ...	343,000*	0	0	0	5	8
Reiherstieg, Hamburg ...	295,000	5	6	0	6	-
Tecklenburg, Geestemunde	295,000*	8	10	10	10	10
Frerichs, Einswarden ...	220,000*	0	0	0	6	8
Neptun Werft, Rostock	147,000	4	6	6	6	10
Flensburg, Schiffbauges.	162,000	4	8	10	10	10
Seebeck, Bremerhaven...	163,000	0	0	8	10	10
Henry Koch, Lubeck ...	176,000*	8	12	12	16	7½
Stettiner Oderwerke ...	112,500*	8	8	5	8	-
Nuscke & Co., Stettin ...	98,000*	0	5	4	5	-
Hansa Werft, Tonning	85,800	Idle during this period.				
Janssen Schmilinsky, Hamburg	14,700	7	-	-	6	10
Kieler Dockges., J. W. Seibel	8,800			5	-	6

Though results were good, no German yard shows what could be called war profits, and the dividends are lower than realised in most other industries. A large proportion of profits has been devoted to improving equipment and to making liberal allowance for depreciation, the latter being very necessary because the renewal of worn out equipment will be very costly after the war. Yards which were in a weak position before the war have strengthened themselves by making heavy allocations to depreciation and reserve. Thanks to this prudent policy, fresh capital has been obtained easily, and yards will be able to cope with the heavy demands made upon them after the war. None of the new yards founded during the war are yet so far advanced as to be able to pay a dividend. The most advanced is the Hamburger Werft, which has already started building vessels.

According to *Hansa*, various vessels ordered in 1914 have been completed, and over 20 fishing steamships were launched during 1916 (or 1916-17). The ss. *Columbus*, built for the Norddeutscher Lloyd in the Schichau yard (Danzig), is completed. Commenting upon Lloyd's statement that 79 steamships (including 45 tugs) were built in German and Austrian yards from the beginning of the war to the end of 1916, *Hansa* says that "this total hardly amounts to the number of fishing vessels launched, and the number of sea-going cargo steamships is not much less."

POMMERSCHE SCHONERFAHRER KOMPAGNIE.—The formation of this company, with a capital of £10,000, to undertake fishing in the Baltic, represents the realisation of proposals first made several years ago.

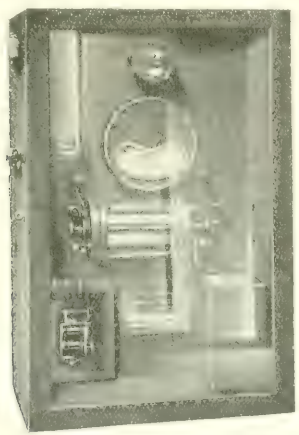
STEAMSHIP APPLIANCES.

THE SIMPLEX PATENT SALT DETECTOR.

The presence of salt in boilers is now universally admitted to be highly objectionable because of the reduced steaming capacity which results from the deposit of salt on the heating surfaces, and also because of the danger of overheating which is always present when there is scale on the surfaces. In the case of water-tube boilers where even a small deposit of salt may have serious consequences, greater precautions are generally taken to keep the feed fresh than with the ordinary type of boiler.

In the ordinary course, the water in the boiler is tested regularly by the salinometer. These tests are satisfactory so far as they go, but give no indication of the rate at which salt is entering the boiler. It is quite evident that the salinometer test may give the same result when there is a very small leakage of salt water into the feed supply for many hours, as it would be if there were a very large flow of salt water for a short time, as, for example, would occur in the case of a split tube in the condenser.

The Simplex Patent Salt Detector is designed to give a *continuous* indication of any salt in the feed water, and thus show the presence



Simplex Patent Salt Detector.

of salt *before* it enters the boiler; also in the event of a sudden increase of salt, as may occur owing to a split tube, or the evaporator priming, it gives warning immediately, and so allows the defect to be remedied before the density of the water in the boiler increases perceptibly. The apparatus is a very simple one, and its working is based on the well known fact that pure water has a high electrical resistance, which, however, falls very quickly if certain compounds, of which ordinary salt is one, are added to the water. The essential part of the apparatus is a glass vessel fitted with two electrodes, by which a current is passed through a sample of the feed water. The necessary current is taken from any convenient power or lighting circuit, either direct or alternating current. The electrodes are made of a special graded carbon and are so arranged that no metal parts of the connections are in contact with the water. The latter is essential to avoid the excessive corrosion which would otherwise take place. The electrodes are adjustable so that the sensitiveness of the instrument can be varied. The instrument is not affected by variation in the quantity of the feed, and the necessary constant supply of feed water flowing through the vessel —entering at the bottom at one end and flowing out at the opposite end.

The resistance of the water falls very rapidly for a small increase in the amount of salt present, and this tends to make the simplest arrangement too sensitive. To obviate this, in the Simplex apparatus a resistance is introduced which is preferably in the form of an incandescent lamp. By varying this resistance, or in other words by using lamps of different candle power, the sensitiveness can be varied as desired. A high candle-power lamp gives greater sensitiveness, and a low candle-power less sensitiveness. The voltage of the lamp should be slightly lower than the line voltage—about 5 to 10 per cent. is a good average value. The lamp shows no light when the water is fresh, but as soon as salt is present will begin to glow a dull red, which gradually increases to full brightness as the salt increases. The brightness of the lamp enables the officer on watch to see at a glance whether there is salt in the feed and also whether it is in sufficient quantity to require immediate attention.

The voltmeter gives a quantitative indication of the amount of salt present, and may be calibrated, if desired. This cannot be done, as a rule, with any great accuracy, however, in the majority of cases, as the readings vary considerably with the temperature of the feed water. In many cases it is desirable to have a definite warning given immediately the salt exceeds a fixed percentage. This is given by a bell or buzzer, which is arranged to be operated by a relay connected in series with the instrument. The relay is very easily adjusted so as to operate at the desired density.

As will be seen from the illustration, the whole apparatus is self-contained in a polished teak case with a plate-glass door. The buzzer is fitted to the outside of the case, while the connection to the electric circuit is made by a plug, so that it is only necessary to insert the plug in the socket, and take a connection from any lamp holder. Should a log be required showing the condition of the feed throughout a watch, or any other period, this can be arranged by having a recording voltmeter with a roll or circular chart operated by clockwork in the usual way.

The sensitiveness of the instrument is very great, and compares well with the nitrate of silver test. One gram of salt per gallon can readily be shown. It is thus very suitable for use in connection with the distilling of fresh water for drinking purposes.

A series of tests have recently been carried out at the National Physical Laboratory at Teddington, for different distances apart of electrodes and with different degrees of sensitiveness obtained by using lamps of different candle-power in circuit. The curves thus obtained show clearly the sensitiveness of the instrument.

The instrument is sold by the Bremell Patents Co., Ltd., of 62, Robertson Street, Glasgow.

Hamburg Shipping Bank Opposed.

An extraordinary general meeting of the Sachsischer Schiffer-verein, held recently in Dresden, was engaged principally with the question of founding a German shipping bank. The Dresden Chamber of Commerce had invited the Union's opinion as to the necessity for such a bank. A committee of the Elbe Shipping Union had already decided that such a bank was desirable; that it should be located in Hamburg; and that by having shipping representatives on the board of the bank, unsound schemes could be rejected and unnecessary investment prevented. The Sachsische Union took exception to these points, many speakers opposing the foundation of such a bank, and asserting that there was not the slightest need to increase the tonnage. On the contrary, there had been great overtonnaging in the direction during recent years. As for the proposal to float capital into Elbe shipping, this would be rejected by Elbe shipowners like a rotten egg, as in the case of Rhine shipping. The proposal to found a shipping bank in Hamburg was accordingly rejected by 20 votes to nine.

GENERAL NEWS SECTION.

PERSONAL.

Mr. John Balfour Alexander, of Montrose, shipbroker, who died on September 29, aged 72, left personal estate in the United Kingdom valued at £5,516.

Captain W. P. Kelly, partner in the firm of Vyvyan, Kelly & Co., shipbrokers, of Cardiff, whose death occurred on November 12, 1916, left estate valued at £4,971.

Captain W. B. G. Stuart, M.C., Royal Irish Rifles, killed in action in the advance on Cambrai, was a son of Mr. Wm. Stuart, C.E., Mount Earl, Ballymena. Before the war he was on the engineering staff of Messrs. Denny at Dumbarton. He had been in the Army since September, 1914, and had recently been awarded the Military Cross. His brother, Lieut.-Commander C. G. Stuart, R.N., won the D.S.C. in the Falkland Islands battle. A third brother is in the Army.

Capt. W. B. G. Stuart, M.C.

Mr. Thomas Spencer, one of the three members of the Marine Engineers' Association chosen to act on the new board appointed by the Government to adjust details in connection with the national standard rates of pay for officers and men of the mercantile marine, is a well-known Tyne engineer, and for a number of years occupied a seat on the South Shields Local Marine Board.

The death has taken place of Mr. Andrew Lindsay, who from 1899 to 1911 was a member of the Mersey Docks and Harbour Board, and for five years was chairman of the Traffic Committee.

Mr. Donald Macleod, of Donald Macleod & Co., ship brokers, of 52, Leadenhall Street, London, E.C., has given a donation of £1,000 to the funds of the Baltic and Corn Exchange Base Hospital at Boulogne.

The death occurred on November 23, at Caterham, of Mr. Allan M. Taylor, partner in the firm of Taylor, Buckell & Co., steamship agents and ship and insurance brokers, of 34, Great St. Helens, London, E.C.

Mr. James Brockbank has been appointed marine underwriter for the Employers' Liability Assurance Corporation in Manchester, where he for many years represented the United Swiss Marine Insurance Company.

The sympathy of North-East Coast shipbuilders and engineers was expressed with Mr. D. S. Marjoribanks, one of the chief officials at the Elswick Works of Sir W. G. Armstrong, Whitworth & Co., Ltd., upon the death in action of his son, Second Lieutenant M. E. Marjoribanks, Northumberland Fusiliers. The deceased officer, who was only 20 years of age, went to France in August last, and was killed in his first engagement.

Mr. G. H. Stansfield has been appointed by the North of England Steamship Owners' Association as their representative on the Newcastle Advisory Wages Board for the civil employment of disabled soldiers and sailors, inaugurated by the Ministry of Labour.

Sir Edward Hain, chairman of the Hain Steamship Company, Ltd., and a member of Edward Hain & Son (St. Ives), Foster, Hain & Read (London), and Foster, Hain & Co. (Cardiff), whose death occurred on September 20 last, left estate valued at £628,677, with net personalty £535,688.

Lieutenant Thomas E. Rome, of the King's Liverpool Regiment, who went out to France early in 1915, has been awarded the Military Cross. He is the eldest son of Mr. Thomas Rome, the chairman of the Pacific Steam Navigation Company, and a member of the Mersey Docks and Harbour Board.

Lieutenant Norman Dugdale, R.G.A., second son of Mr. W. H. Dugdale, managing director of S. P. Austin & Son, Ltd., shipbuilders, Sunderland, has been awarded the Military Cross for conspicuous gallantry on the battlefield. Lieutenant Dugdale served his apprenticeship as a shipbuilder with J. L. Thompson & Sons, Ltd., on the Wear.

Mr. R. S. Dalgleish has been elected a shipowners' representative on the Tyne Improvement Commission, in succession to the Lord Mayor of Newcastle (Mr. George Lunn), who recently resigned his seat on that authority. He belongs to the younger men in local shipping, and takes a prominent part in matters affecting maritime commerce.

A presentation was recently made at the Mercantile Marine Offices, Cardiff, of a bronze clock and certificate, awarded by the Royal Humane Society, to William Touhey, of the steamship *Bantaeugdd*, for rescuing a Russian lad from the sea at Solambana. He was recently awarded the Society's certificate for rescuing a seaman at the same port.

The Hon. Sir Charles Parsons, K.C.B., F.R.S., member of the Council of the Institute of Metals, is to give the eighth annual May Lecture before the institute next spring. He will deal with the subject of the formation of diamonds. For over 30 years he has been experimenting upon the production of artificial diamonds. An account of his researches, which have an important bearing on many branches of applied science, cannot fail to be of the greatest interest.

Mr. Christopher Hannevig, junior, the Norwegian shipowner and part proprietor of Hannevig's Bank, Ltd., London, who has acquired a large fortune during the war, has just made munificent gifts to the city of Christiania, which approximate £575,000. One of the gifts is an imposing fountain costing 1,000,000 kroner, and another is a magnificent opera house which is expected to cost over 7,000,000 kroner. Mr. Hannevig is 33 years of age, and a son of the famous shipowner, Mr. C. Hannevig, formerly of Norre, but now residing in Denmark.

The death occurred on November 25 of Mr. Lowry Rusden, consulting engineer, engineers' agent and merchant, of Newcastle. He was a native of Falmouth, and came to Tyneside in the early 'seventies. Later, he became chief draughtsman of the Wallsend Slipway & Engineering Company, Ltd., and was subsequently manager for nine years, under the directorship of Mr. William Boyd and the late Mr. Charles Mitchell. He was closely associated with the conversion of compound marine engines into triple-expansion engines, was one of the pioneers of the introduction of oil fuel for marine boilers, and was the inventor of a successful oil-fuel burner.

Staff Paymaster W. M. Davies, R.D., R.N.R., has been promoted by the Board of Trade to the position of superintendent and Lascar transfer officer at Barry. For the past seven years he has been superintendent of the mercantile marine office at Penarth. The official status of the Barry position has been raised in view of the importance of the duties performed there. The Board have also promoted Assistant Paymaster H. J. Robinson, R.N.R., to succeed Staff Paymaster Davies in the duties of superintendent and Lascar transfer officer, with the appointment of examiner in form vision, in pursuance of regulations made by the Lords Commissioners of the Admiralty and the Board of Trade.

The death has occurred at the age of 71, of Mr. Alexander Adamson. He was a well-known naval architect, and a native of Glasgow. Mr. Adamson served his apprenticeship with Randolph, Elder & Co. (the Fairfield Shipbuilding & Engineering Company, Govan), and afterwards became naval architect to the firm. Subsequently he was shipyard manager successively to Palmers' Company, Jarrow; Armstrong, Mitchell & Co., Elswick; and the Naval Construction Works, Barrow (of which he became managing director). He was a member of council of the Institution of Naval Architects and a member of Lloyd's Register Technical Committee. When at Fairfield he designed the original "Atlantic greyhounds," *Arizona*, *Alaska*, &c., the Cunard liners *Umbria* and *Etruria*, as well as many other well-known vessels.

TWO THOUSAND GUINEAS OFFERED FOR SHIPPING APPLIANCES.

T. G. Beatley & Son, steamship owners and brokers, of 57 & 58, Leadenhall Street, London, E.C.3, are making two substantial offers of 1,000 guineas each, to inventors, engineers, and others. The particulars are as follows :—

(1) The sum of 1,000 guineas is offered to any person of British, allied, or friendly nationality and origin who, in the opinion and to the satisfaction of the firm, invents and produces the best appliance or device for increasing the speed of steamers at a moderate cost. (Communications should be marked "Speed.")

(2) A second sum of 1,000 guineas is offered to any person of British, allied or friendly nationality and origin who, in the opinion and to the satisfaction of the firm, invents and produces the best appliances or devices for rapid and efficient loading and discharging of timber, coal, iron ore, and general cargoes, capable of being applied at moderate cost to the ordinary type of steamer now in use, or a proportion of the sum offered in the case of an invention applicable to one kind of cargo only. (Communications to be marked "Cargo Appliances.")

The following are the conditions under which both the above sums offered are made :—

(1) The principal of T. G. Beatley & Son to be the sole judge of the merits and suitability of the inventions, and his decision shall be final, binding, and unassailable in any Court.

(2) The above-mentioned firm to have the first option of acquiring the world rights of the inventions, if accepted, at a price to be agreed on. The above sum of 1,000 guineas, respectively, or proportion thereof, as above, shall not in any case be payable unless the rights are acquired by T. G. Beatley & Son.

(3) Proposals accompanied by complete particulars of suggested appliances, or devices, if of *prima facie* utility, will be considered by T. G. Beatley & Son, but they do not bind themselves to accept any of them.

The offers are to hold good until the end of 1918.

SHIPPING AND OTHER MEETINGS.

Dec. 11 *Tues.*—John J. Fitzsimons & Co., Ltd.—Annual General, Winchester House, Old Broad Street, E.C., at 12 noon.

Dec. 12 (Adj.) Mersey Docks and Harbour Board—nomination of Elective Members, Dock Office, Liverpool, at 12 noon.

Dec. 13 *Thurs.*—Pyman Bros. & Co., Ltd.—Shire Navigation Company—Ordinary General, 122, Leadenhall Street, E.C., at 11 a.m.

SIGHT TESTS FOR LOOK-OUTS.

To enable shipowners to meet the requirements of an Admiralty Order of November 16, 1917, requiring that every merchant vessel of 2,500 gross tons and upwards shall have on board seamen qualified to perform the duty of look-out, the Board of Trade have provided facilities for the examination of seamen in form vision, for the purpose of ascertaining that their sight is adequate to enable them to keep a good look-out.

A candidate will be required to possess normal vision, using both eyes together, or at his option, either eye separately.

A successful candidate will be given a certificate, and an entry will also be made in his Discharge Book, to the effect that he has passed the Board of Trade form vision test. The fee for the examination, including the certificate, will be sixpence; and the seaman will then be eligible for engagement, with additional pay as look-out, under conditions laid down in the Admiralty Order.

Any seaman who wishes to have his form vision tested can do this by presenting himself for examination in the form vision test at any of the following mercantile marine offices :—

England and Wales.—North Shields, South Shields, Newcastle, Sunderland, Hartlepool (West), Hull, Grimsby, Yarmouth, Lowestoft Tilbury (Essex), London (Dock Street, M.M.O., E.1, Poplar, M.M.O., E.14, Victoria Docks, M.M.O., E.16), Ramsgate, Southampton, Brixham, Plymouth, Avonmouth, Bristol, Newport, Cardiff, Penarth, Barry, Swansea, Liverpool (Canning Place, M.M.O.), Manchester, Fleetwood.

Scotland.—Aberdeen, Dundee, Leith, Greenock, Glasgow.

Ireland.—Dublin, Belfast.

Application should be made to the superintendent and the fee paid to that officer, and applicants should present themselves as soon as the mercantile marine office is open in the morning.

FROM OUR CORRESPONDENTS.

CLYDE DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Glasgow Dockers' Wages.—The Committee on Production have issued their award in connection with the application made some time ago by the dock labourers at Glasgow harbour for an advance of wages. The Committee find that time workers are entitled to an all-round advance of one penny per hour on the existing rates, making the new rates 1s. 1d. per hour for ordinary work, 1s. 4d. per hour for overtime, and for overtime work on liners 1s. 3d. per hour. Ore workers have also received an advance of one penny per hour worked in addition to their piecework rates, but the piecework rates remain unchanged. The new rates came into operation on Saturday last.

Welfare Work in Shipyards.—There are now comparatively few of the large shipbuilding and engineering concerns on the Clyde which have not done something in the direction of establishing schemes for the welfare of their apprentices. Several firms have appointed special welfare workers whose duty it is to look after the moral and educational interests of the youths in the employment of the firms. Scotts' Shipbuilding & Engineering Company, Greenock, who employ over 600 youths between the ages of 14 and 18, have gone a step further, and established a club for these lads. Commodious and centrally situated premises have been secured and adapted for the purposes of a club. In addition to the usual recreation rooms, gymnasium, library and lecture hall, the premises also contain study rooms, where the youths who attend evening classes may have an opportunity of preparing their lessons.

Apprentices in Engineering.—Practically all the educational authorities in the Glasgow area have been giving earnest consideration to the question of the training of apprentices, particularly in connection with the engineering industry. On the invitation of Glasgow School Board representatives of employers and employed have agreed to set up a committee which will consider the whole question of the training of apprentices in the engineering trade in the district. The school Board authorities report that during the past year there has been a large increase in the number of youths who have enrolled at the Board's special courses in engineering. Commenting on this fact, the Chairman of the Board stated, at a recent meeting, that at their last course they had an increase of almost 300 boys. Another lever boy in Glasgow, he said, seemed to be rushing to enter an engineering shop now, and he was afraid that was making it very difficult for the smaller trades to get apprentices at all.

The Scottish Ship Canal. A good deal of work is being done by the Mid-Scotland Ship Canal Association with a view to bringing the claims of the "direct route" before the attention of the Government. It was reported at a recent meeting of the Executive Committee of the Association that a firm of civil engineers are at present inquiring into the question of the debouching of the direct route canal into the Clyde, and as to whether it will bring about congestion of the river, and also as to the possibilities of deepening the river to carry battleships of the largest size. This report when completed will be placed before the Government. A Government Committee, it is stated, is at present considering the canal question, and on this Committee the Admiralty, the Board of Trade, and the Committee on Reconstruction are represented. The Admiralty are believed to be in favour of the Loch Lomond route for naval reasons, but from a commercial point of view opinion in Scotland is almost wholly in favour of the direct route. Some time ago, plans prepared by Sir W. G. Armstrong, Whitworth & Co., were submitted to the Admiralty. This firm, it is understood, are now engaged in preparing plans for the construction of the proposed canal by the direct route.

War Risks in Coasting Trade.—Intimation was made towards the end of last week to shipowners of an arrangement which has been made by the Board of Trade whereby the Board is prepared to take the war risk on cargoes carried by steamers in the coasting trade. The rates are as follows:—(1) To and from any ports within a line drawn from the Clyde to Londonderry inclusive, and a line drawn from the Bristol Channel to Dublin inclusive, 5s. per cent. (2) To and from ports on the west coast of Great Britain (not south of the Bristol Channel and not north of the Clyde) to ports on the east and south coast of Ireland (south of Dublin, but not west of Cork), 7s. 6d. per cent. (3) All other voyages than those named in 1 and (2) coasting round Great Britain and/or Ireland, 10s. per cent. The method of procedure is as follows:—All coastwise steamship owners are authorised to accept insurance on behalf of the War Risk Office at the rates mentioned above, and they will stamp on the bill of lading or receipt for the goods the following clause in prominent type—"War risk insurance covered by the Government War Risk Office, value to be the same as in marine policy." The shipowners will collect the premium from the shippers, and on the sailing of a steamer on each particular voyage, will forward all necessary particulars and cheque for the premium to the Secretary for the War Risk Insurance Office. The scheme came into operation on Monday last.

NORTH-EAST COAST DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Advances in Wages.—The Executive Council of the National Amalgamated Union of Labour, whose headquarters are in Newcastle, have instructed their district delegates to make application for an advance of 5s. per week in respect of ferrymen employed by the River Tyne Commissioners; men employed on construction works, engineering works and floating craft by the River Wear Commissioners, and men similarly employed by the Blyth Harbour Commissioners and the Tyne Coal Hulk Co., North Shields.

Improvements on the Wear. Steady progress is being made with riverside enterprises on the Wear. At the last meeting of the Wear Commissioners, Swan, Hunter and Wigham Richardson, Ltd., were given sanction to extend their quay frontage at their Southwick shipyard by about 300 ft., and a provisional agreement was entered into with T. W. Greenwell & Co. to lease to them, for a period of 60 years, the Commissioners' No. 1 Graving Dock, at Scaup Dock. Col. McKenzie, the chairman of the Traffic Committee, remarking that the work it was contemplated carrying out at the port would be of national value.

Gifts to Trinity House. Interesting additions have just been made to the ancient chapel in the Trinity House, Quayside, Newcastle. These are altar ornaments, including a cross, the gifts of the Master, Capt. J. Watson; the Deputy Master, Capt. J. T. T. Carr; and the Secretary, Mr. Hadlon T. E. Henzell. The organ was presented by Mr. Henzell. The altar has been raised, and other improvements effected at the cost of Capt. C. K. Sergeant, and the chapel has been thoroughly renovated. The Trinity House is the ancient abiding place of the Guild of Masters and Mariners, and its present home dates back to the year 1492.

Prosperity of Jarrow. During the war the town of Jarrow, which was created very largely by the shipbuilding enterprise of the late Sir Charles M. Palmer, Bart., has been very prosperous because of the national demand upon its shipbuilding resources, and its capacity to produce steel, and it will be clear to the reader to know that Mr. A. B. Gowan, the managing director of Palmer's Shipbuilding and Iron Co., Ltd., takes a very optimistic view of the borough's industrial future. Speaking at a public assembly in the town the other day, he said Palmers Company were determined to go on extending their business, with a view to making it more substantial and steady, and to give regular employment to the people. He predicted that investments in property in the borough would be good as time went on.

The Tax on Flour.—Matters of general as well as local interest were discussed at the last meeting of the North of England Steamship Owners' Association. It was agreed to draw the attention of the Chamber of Shipping to the tax of 18s. per sack on all flour which was put on board ship in this country as ship's stores, with a view to having it abolished. The position of the Tyne Pilotage Scheme, under the Pilotage Act of 1913, which was approved by the Association previous to the commencement of the war, was considered, and it was stated that the Board of Trade regretted that under existing conditions it was impracticable to bring such schemes before Parliament for the necessary confirmation at the present time, but that the scheme prepared by the Tyne Pilotage Commission would be proceeded with at the earliest opportunity.

Output of Ships.—Mr. Tom Wing, M.P., for Houghton-le-Spring Division, inaugurated last week a successful series of midday hour meetings at the gates of the shipyards on the Wear, to urge the workmen to do all they could to increase the output of ships, the speaker emphasising the need of more and more tonnage if the submarine menace was to be overcome. At each gathering a resolution appropriate to the object in view was very heartily carried. There is reason to believe that both employers and workmen are doing their best at this time of grave need, and it must have been pleasing to everybody to read of the Prime Minister's satisfaction at the joint suggestions lately laid before him at Downing Street, by representatives of the shipbuilding employers' national body, and of the leading trade unions in the industry. Mr. Lloyd George described it as a unique deputation, and one that augured well for the future of industrial relations in the country.

Trade after the War. The trade of the country has been so circumscribed by regulations and restrictions since the war commenced that one can quite understand a good many business people that not a day should be lost in removing the irksome restraints after peace is concluded, and therefore, when the Government seeks to pass a measure, entitled the Imports and Exports (Temporary Control) Bill, which, if passed into law, would give controlling powers to the Government in the matter of imports and exports for a period of three years after the war, there can be little surprise at strong opposition manifesting itself among the traders. A largely attended meeting of the Newcastle Chamber of Commerce voiced its sentiments on the subject in no uncertain manner, and passed a resolution viewing "with alarm and dismay" the Bill now before Parliament, seeking to establish control of Government over trade of imports and exports for a period of three years after the termination of peace," and protesting against the measure being passed, that no Bill should aim at an extension of the time limit of the present powers beyond six months after the conclusion of hostilities. If the circumstances made it necessary for an extension beyond six months, then the necessary control should be restricted to application for three years was regarded as quite sufficient for the continuance of present powers.

MERSEY DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Dockside Carters' Wages. The [illegible] the proposal recently accepted by the dockside carters at the port, [illegible] per week, [illegible] each to [illegible] men, one horse [illegible] and double horse, motor drivers, [illegible] steam [illegible] of the 13s. per week [illegible] This [illegible] into force on Saturday, December 1. The [illegible] being the conditions of work [illegible] consideration, till the termination of the war.

Government Control.—A largely attended meeting of Liverpool commercial men [illegible] Friday [illegible] protesting against any [illegible] which can be carried on through existing pre-war channels, and

also against the exports and Imports Control Bill, in its present form. There is no disguising the fact that Liverpool merchants are very uneasy about the Government's attitude, and its unnecessary interference with trade. The Bill will be opposed by all the weight of the Liverpool commercial community, and the Chamber of Commerce.

Standard Wages for Clerks.—The newly formed Mersey Shipbuilding and Repairing Clerical Society has been able to fix up a working arrangement with the Mersey Ship-Repairers' Federation and the Shipowners' General Labour Committee (Engineers' Department). The agreement fixes the standard rates of pay from 24s. per week for juniors of 18 years of age, rising by an increasing scale to 50s. per week on attaining the age of 24. Cost clerks, timekeepers and storekeepers, 22 years of age and over, will receive 60s. per week. All overtime, Sundays, Bank Holidays, &c., to be paid on the 47 hours' agreement sliding scale. Further general awards by the Committee on Production to be given to the members of the Society.

Traders' Risks.—The Manchester Association of Importers and Exporters are of opinion that the recent House of Lords judgment on the railway companies' owners' risk contract adversely affects the position of traders, and they are urging that the Government should make it legally, and unmistakably clear, that when the word "consignment" is used in the railway conditions and contracts it shall mean that the railway companies must be liable for full delivery of each and every package or item in a consignment, which passes from the sender to the carriers' custody, and for which a clean receipt has been given. They are being backed by important trading bodies in the country, and the matter is not likely to be left where it is.

Trade Reconstruction after the War.—There is a good deal in what Mr. Marshall Stevens said at the recent annual meetings of the Trafford Park Estates and the Port of Manchester Warehouses, Ltd., that requires meditating upon by those who are now solving the problem of trade reconstruction after the war. He attributes the present handicap of the British trader with his foreign competitors to the fact that our railways are badly directed; "that it costs traffic more to maintain a central goods station in any large town—without providing a single service there—than it costs for the whole of the railway service and accommodation in Trafford Park, including shunting, marshalling, invoicing and conveyance." He claims that an effective general merchandise railway service could be obtained here at no greater cost to the trade than in Germany or elsewhere, and without any reduction of shareholders' dividends. His remedy is to "substitute railway facilities like those of Trafford Park, in place of the conventional English goods station upon any British main line, and that main line will then obtain more in the aggregate for conveyance, when charging the low continental rates, than when charging the present rates for the same traffic, conveyed a like distance between two large town stations." Mr. Balfour Browne, K.C., who is also a director of the Trafford Park Estates, Ltd., urged that the railways should be purchased by the Government, and leased to the companies to work.

Mr. Marshall Stevens made an indictment against Shipping "Conferences," which, he said, before the war had given lower freights to German manufacturers than to our own, and which, by a strict division dictated by shipowners of our own British traffic between particular ports and lines, had hitherto prevented our manufacturers and shippers from taking advantage of direct transport. Because of these conference arrangements, he said, "hundreds of thousands of tons of Manchester and district merchandise, which should be shipped at Manchester, are unnecessarily railed to Liverpool and London, and tens of thousands of railway wagon journeys, and millions of ton miles of locomotive haulage are being needlessly occupied out of Manchester alone. Under the changed conditions, which will prevail after the war, it does seem desirable that this barrier to direct transport to and from Manchester should be removed, or at any rate, that the 'Conference' arrangements shall not operate, as before the war, in favour of the foreigner, as an example cited by Mr. Stevens proved was the case.

SOUTH WALES DISTRICT.

(From OUR OWN CORRESPONDENT.)

A Tribute to Seamen. Lord Beresford, Mr. Havelock Wilson and Mr. A. V. Sellon, M.P., were introduced to a meeting of the Cardiff Incorporated Chamber of Commerce by Commander Sir Edward Nicholl, R.N.R., who paid the seamen the tribute of being the one great body of workmen who had exalted patriotism above private interest, and had not marred their glorious record by any strike—a fact which reflected as much credit on Mr. Wilson as it did on seamen as a whole.

Utility of Chambers of Commerce.—Speaking on a resolution moved to increase the members' subscriptions from £2 2s. to £5 5s. per annum, the President said that in the eyes of the Government the Cardiff Chamber of Commerce stood very high indeed. Other business men on the Exchange would do well to work through the Chamber, as they might depend upon discretion and secrecy being observed when necessary. The Shipbrokers' Association the other day had applied for the management of a certain number of Government ships; it would have been far better for them to have made the application through the Chamber of Commerce.

Naval Protection for Mercantile Marine.—Mr. T. E. Watson, president of the Cardiff Chamber of Commerce, stated at a meeting of that body that he had received a reply from the Admiralty in regard to the resolution passed at the last meeting of the Chamber in regard to the submarine menace. The letter was confidential, and he suggested that the Council should be empowered to take the letter into consideration and send a reply. One paragraph in the letter called attention to the statement made by the First Lord of the Admiralty to the effect that only one out of 200 vessels under convoy was sunk. In regard to the American trade 90 per cent. of the vessels were convoyed, and in the French trade out of 12,446 convoyed from March to October 27, only 20 were lost. That showed that whilst the loss of a cargo or ship might loom large in their eyes, they were apt to forget the large number of ships which crossed the seas every day.

Cardiff Shipowners and Blue-Book Rates.—At a meeting of the Cardiff and Bristol Channel Shipowners' Association the question of the present Blue-Book rates was under discussion. Statistics were produced showing that on the present rates shipowners were actually losing money. It was decided to urge upon the Shipping Federation the desirability of making strong representations to the authorities with the view of securing remedial measures. The report of the Welsh Industrial Unrest Commissioners was also referred to, when the following resolution was adopted:—"That this meeting of the Cardiff and Bristol Channel Shipowners' Association, whilst cordially agreeing with the recommendations of the Welsh Commission on Industrial Unrest, which aim at more friendly relations between employers and employees, is, nevertheless, of opinion that the recommendations of the Commission, in so far as they are intended to apply to shipping, are either wholly impracticable or fraught, if adopted, with serious menace to the true interests of the country."

The Shipping Industry and Shipowners' Profits.—An enthusiastic reception was accorded Lord Beresford and Mr. Havelock Wilson on the Cardiff Coal and Shipping Exchange. They attended and addressed the monthly meeting of the Chamber of Commerce. Mr. T. E. Watson, introducing the visitors, said that there was a time when Mr. Havelock Wilson would not have been greeted by that audience with so much applause as he was that day. Lord Beresford said that the very existence of the British Empire would depend upon the success of the work of reconstruction of industry after the war. In regard to shipping, neutrals were already putting by enormous sums of money for the purpose of rebuilding their mercantile marine. He did not think that the Government had been wise in their policy in regard to the shipping industry. He would have liked the Government to have taken all the money not on loan, to be refunded after the war for the purpose of shipbuilding, and so give our shipowners a chance of competing with neutrals. It had been stated that neutrals had placed something like £2,500,000 for the purpose of shipbuilding by British shipbuilders. What security was there that these ships afterwards would not be diverted to Germany, in which event we should have to face a bad position.

Mr. Havelock Wilson said that it was in rather a startling position he found himself in that day. Havelock Wilson addressing the Cardiff Chamber of Commerce. We were all concerned very much about the shipping industry, and was the industry which had made our Empire great in the past. He was annoyed at some gentlemen talking about the enormous profits made by shipowners. He knew a little about the shipping trade, and he would tell those gentlemen that during the last 60 years the shipping industry had been the least profitable trade in the country. If they were to take the average profit of the shipping industry during that period they would find that it would not work out at more than 2½ or 3 per cent. The

future of the shipping industry, in his opinion, depended very largely upon the good understanding between shipowners and the men. He hoped the employers would back up the seamen in their deliberate intention to punish the Germans by boycotting them. With regard to his own views on State control, Mr. Wilson said that he wanted no State interference as far as shipping was concerned. The men were well able to meet the owners, and talk with them, and settle their differences; they did not want any State officials in at all.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London. There is no alteration in the conditions attending chartering business on the Baltic Exchange, which continues to move within a small compass owing to the shortage of available tonnage. Rates consequently remain high. Pressure for carrying space is still being exercised from the East and North America. Tonnage on net terms of charter is needed at the ports of the North American Atlantic seaboard, the current rates being 230s. to the United Kingdom, 260s. to France, and 360s. to Italy, with 30s. more for Gulf loading. Interest in tonnage for carrying heavy grain from the Northern Range ports is maintained, and 40s. is obtainable to the United Kingdom or 45s. to France, and 70s. to Italy. From Virginia coal cargoes offer at 117s. 6d. to 120s. to the River Plate. Sugar, Cuba to France, can be done at 290s., nitrate is available at 185s. to 190s. to the country and 200s. to Italy, and 820 per ton is the current freight to oil-fitted vessels which can take linseed from the Plate to the United States. Rates are unchanged from the East. Karachi offers 250s. to the country on scale basis. Bombay 275s. to the same destination on dw. and 400s. to the Mediterranean, and kernel cargoes offer at 550s. from Madras Coast to Marseilles. The rice position still holding 600s., which figure can be had from Saigon or Bangkok to France or the United Kingdom. In the Mediterranean section of the market, business is being done from the ore and phosphate rates on the unchanged basis of 45s. from Huelva to the Mersey, or 60s. for pyrites to the East Coast United Kingdom, 50s. Bilbao to Boulogne, 80 fr. Sfax to Bordeaux, 50s. Borgo to the Clyde, and 70s. Sfax to the Bristol Channel. Salt cargoes are worth 52s. 6d. Torrevieja to Calcutta. Bay rates are also unchanged, fixtures having been done at 22s. 6d. Bordeaux to Bristol Channel and 24s. Bayonne to the same destination.

Glasgow. Quiet conditions have prevailed on the Glasgow market since our last report. The supply of tonnage has been as restricted as ever, and it has only been possible to transact business in a small way. Where free tonnage was available, however, rates were firmly maintained. Among the fixtures reported were the following:—Sundswall and Umea, 600 stds., Hull, 350 kr., D.B.B. and box boards (freight p epaid); Buenos Ayres, 1,500, Cette, lump sum, £40,000, prompt; sailing vessel, Rosario to New York, 2,600, 81s. prompt; sailing vessel, Pensacola to Buenos Ayres, 2,300, 81s, timber; time charter, States and West Indies, 2,800, 35s., one round trip, delivery and re-delivery north of Hatteras, December; time charter, States and West Coast of South America, 5,200, 40s., one round trip, delivery New York, re-delivery north of Hatteras, December.

Newcastle-on-Tyne.—Because of the paucity of "free" tonnage, whether Allied or neutral, business in the local chartering market has been exceedingly limited. At the time of writing the scarcity is most severely felt, and colliers are finding it very difficult to continue their operations in full, in view of the lack of cargo space. This difficulty is being aired to by the circumstance that official requisitioning has declined and that fewer vessels on official account are being provided. The result is that idle time at the pits is assuming formidable dimensions and the outlook is correspondingly serious. Business actually done has been merely for Swedish ports, viz., 190 kr. to Gothenburg, a rate which shows no change on the week, and 200 kr. to Stockholm, which is one shilling up on the week's report. Two big vessels have been fixed for coastwise coal loading. Otherwise nothing has been done save for a few odd cargoes for French Atlantic ports and for ballast ports. There is very brisk inquiry for most Allied and neutral destinations. The Spanish Atlantic is firm at 160s. for Bilbao or Santander. Portugal coals tonnage, and 95s. continues offered for Lisbon, with 105s. for Oporto. The coaling stations are firm at 100s. to Gibraltar and 200s. to Port Said. The Spanish Mediterranean has displayed some weakness during the week, the quotation to Barcelona having receded to 280s., but at the time of writing 300s. is again offered.

Liverpool.—The outward freight position here is unchanged from a week ago, and summed up, the demand for ships is as active as ever, but the supply is very limited, especially at the coal ports, and business done is mainly to Allied or controlled ports. Time chartering is also slow for the same reason, but there is no lack of inquiry for European and American trades. Rates are consequently very firm, and 46s. 6d. has been paid for 12 months in the general trades, 40s. for a States-West Coast South America round, and 35s. for a States-West Indies round trip. Homeward freights are quiet, but firm all round. Easterns and Indies still unable to get ships, are offering attractive rates to Mediterranean and United Kingdom ports, 600s. being indicated, rice, Saigon to France. North America keeps firm for net charters at late rates, while grain maintains a steady tone on basis of 40s. from Range ports to United Kingdom. Nitrate ports are slow, and indicate 185s. to United Kingdom, and 200s. to Italy. River Plate homewards still quotes 145s. up-river to United Kingdom, but little doing. Mediterranean ports have a good inquiry to home ports, and free tonnage could be very profitably employed there at the moment.

Cardiff and Swansea.—The feature of the market in the period under review is the extremely high figures quoted for neutral destinations. The market in this respect has been stronger than ever. A vessel of 2,600 tons was fixed for Barcelona at 350s., a rise of about 100s. on the last fixture reported for that port. It should be noted that all coal to Spanish ports is carried in boats owned in that country. Chartering for other directions shows but little alteration, and has been mainly for Allied ports. The fixtures reported for France were: Havre twice at 45s. 9d. (neutral); St. Malo 21s. (Allied) and 43s. 6d. (neutral); Rouen, three times at 48s. 9d. (neutral) and 74s. 3d. coke (neutral). A small sailing vessel was fixed for Granville at 100s. The only other transactions made public were Dakar at 90s., and Monto Video, option Buenos Ayres, at 130s. On the Swansea market an active demand still prevails, and rates have been upheld for all directions. Tonnage remains short of requirements. The only business divulged has been for France: Caen at 46s. 6d. and 48s.; St. Malo, 43s. 6d. and 45s. 9d.; and Rouen, 49s. 6d., fuel, all for neutral steamers.

Hull.—The market continues to be full of inquiry, but at the same time full of difficulty for exporters and charterers. In the West Italian market business has been quiet. In the North French market a fair trade is doing in small sailing vessels and coasting steamers to the North French group of ports, but even in this section of the market tonnage is scarce. In the neutral markets some business has passed to Gothenburg from Hull, but elsewhere trade is quiet.

COMPANY REPORTS AND DIVIDENDS.

Blyth Shipbuilding & Dry Docks Company, Ltd.—The directors have decided to recommend the payment of a final dividend of 5 per cent., making, with the interim dividend, 10 per cent. for the year, the same as last year.

Tedcastle, McCormick & Co., Ltd.—The directors have declared the following interim dividends for the half-year ended September 30 last: on the ordinary shares (£5 fully paid), 6 per cent. per annum; on the preference shares (£5 fully paid), 5 per cent. per annum. Warrants are to be posted on December 14.

Ellerman Lines, Ltd.—The directors recommend a distribution of £100,000 on Deferred shares for the first half of 1916, adding £750,000 to the reserves, making the reserve and guarantee funds £1,000,000. The deferred shares amount to £50,000. Therefore the dividend for six months will be 200 per cent. The payment for the first half-year has not been announced.

Buenos Ayres Southern Dock Company, Ltd.—The report for the year ended June 30 last is now available. The gross receipts of the working of the Dock for the year amount to £83,889, and the working expenses to £45,027; thus the net receipts amount to £38,862, showing a decrease compared with the previous year of £7,089. To the amount of net receipts must be added profit on remittances £2,072, and interest from deposits, &c., £5,437. The sum of £23 is deducted for bill stamps, making a total of £46,348.

John Brown & Co., Ltd. The directors have resolved to pay an interim dividend of 5 per cent. on the ordinary shares, viz., 1s. per fully paid share, and 9d. per part paid share, less income tax. This dividend will be payable on December 20 to shareholders on the books of the company at November 30, and the usual dividend on the preference shares will be payable on the same date.

London-American Maritime Trading Company.—The report for the year ended July 31 shows a profit, including £17,941 brought forward, of £87,517, as against £167,866. After providing for debenture interest and placing £20,000 to reserve for contingencies, the director recommend a further dividend of 7 per cent. on the ordinary shares, making 12 per cent. for the year, leaving £16,331 to be carried forward. The profits and dividends for the past three years compare as follow :—

Year ended July	Profits. £	Ordinary Dividend. Per cent.
1915	158,661	27
1916	87,517	20
1917	69,656	12

Rhederei Aktien Gesellschaft (1896), Hamburg.—The proposed increase of capital from £122,500 to £245,000 has been accepted. In addressing a general meeting on this subject, Konsul E. Nolting said that the proposed increase would enable the company to participate actively in the reconstruction of the mercantile marine, and to take advantage of the new German Reconstruction Act. The war had lasted so long and its effects had been so severe that provision must be made now to start work again as soon as possible after the war. Ship values had risen so enormously that the company would need considerable liquid assets in order to be able to provide "replacement" vessels, even when taking full advantage of the considerable assistance rendered by the State in this direction. It was proposed to provide larger vessels as substitutes for those lost. In view of the expansion of the company another member has been added to the council and the place of the late R. Cuncl has been filled. The new members are: Emil Watjen (Bremen) and Direktor Franz Horn, of the Dampfschiffs Rhederei Horn A.G., Lubeck.

John I. Thornycroft & Co., Ltd.—The directors express their regret that, owing to circumstances over which they have no control, it has not been possible to prepare the accounts of the company up to July 31, 1916. Until the figures up to July 31, 1916, have been settled, the accounts for the next financial year of the company ending July 31, 1917, must also be held in abeyance. The directors would have made up the accounts to July 31, 1916, estimating, to the best of their ability, the company's liability under the Munitions of War and the Excess Profits Acts, but the questions outstanding render such considerable amounts that it is quite impracticable to do this. The whole of the resources of the company continue to be employed on war work. The last dividend was stated in a circular to shareholders of November 29, 1916, to have been more than four times the pre-war average. During the year under review it has further increased, but owing to the provision have been limited by the new power available. The directors feel satisfied that the profits of the company, after deduction of debenture interest and [illegible] already paid on preference and ordinary shares, will allow of the payment of final dividends of 3 per cent. on the preference shares and 10 per cent. on the ordinary shares and leave a substantial balance for transfer to reserve account.

P. & O. Steam Navigation Company. The report for the year ended December 30, 1917, states that after making provision for depreciation, bringing the Panama Canal Service Fund up to £500,000 and adding £50,000 to the Contingent Fund, making it £1,000,000, a credit balance on the year's accounts, including £29,[illegible] brought forward, of £[illegible] The directors propose [illegible] with the balance as follows: Five per cent. dividend on [illegible] £1,[illegible]; 12 per cent. dividend and 6 per cent. bonus on the ordinary stock, £[illegible]; 6 per cent. on the deferred stock, £[illegible]; 6 per cent. on the deferred stock recently created [illegible] leaving £[illegible] to be carried forward. The dividends, [illegible] payable on and after [illegible] 18. During the year £[illegible] has been written off the [illegible] account, and £106,300 has been added to the Insurance Fund, leaving the latter £[illegible] Owing to the past year the whole of the [illegible] Company's Charter, has been taken over for account of the Government. Several steamers have been lost during the year, owing to enemy action. The directors are glad to be able to state that the loss of life involved was very small, thanks to the discipline observed. The two mail steamers which have been under construction for three years will be shortly delivered, but they are being finished meantime as cargo carriers only. A contract has been entered into for the building of a large mail steamer of 16,000 tons, but her delivery is uncertain. The arrangement with regard to the offer made to the ordinary shareholders of the Union Steamship Company of New Zealand, Ltd., whereby the company acquired the ordinary shares of that company, having been approved at the meeting of stockholders on June 27, has been carried out, and shareholders holding 98 per cent. of the Union Steamship Company of New Zealand shares have already accepted the offer. In consequence of the requisitioning arrangements referred to, the directors have agreed, as a temporary war measure, to restrict the service as from July 1 last to a fortnightly line to and from Bombay. This, of course, involves a modification in the amount of the subsidy, which has been agreed with the Post Office. The mail service has been worked regularly, but at a great additional cost. Since the close of the company's financial year, the directors have purchased the shares of the Hain Steamship Company, Ltd., which came into the market owing to the death of the founder of the line. This fleet comprises some 27 large up-to-date cargo steamers, with a gross tonnage of 108,787 tons, and the purchase-money, which will be in cash, will be provided by the company in conjunction with the British India Steam Navigation Company. The British India Steam Navigation Company has acquired the shares of the Nourse Line, which owns six steamers with a gross tonnage of 23,496 tons. The vessels are of recent construction and were built specially for service in the tropics. The Nourse Line has a valuable trade in the East which will work in well with the British India services. The directors again express their high appreciation of the services rendered by all officers and ships' companies afloat in the very arduous work which they have performed during the past twelve months, and the fact that there has been no maritime loss, and that the losses which have occurred in consequence of the war have been almost entirely free from casualties, is evidence of the good work which has been done.

COMPANY REGISTRATIONS.

Shannon & Shannon, Ltd.—Capital, £1,500, in £1 shares. Objects: Marine insurance agents and brokers, underwriters, marine insurers, &c. Signatories:—

E. E. Bell, 8 L, Pearl Assurance Buildings, Market Street, Bradford, marine insurance agent.

J. H. Gr[illegible], Pearl Assurance Buildings, Market Street, Bradford, marine insurance agent.

B. Brierley, 26, King Street West, Manchester, certified accountant.

J. B. Domakin, 33, King Street West, Manchester, solicitor.

C. Ev[illegible], King Street West, Manchester, solicitor.

The first directors are to be appointed by the subscribers. No qualification required. Solicitors, J. B. Domakin & Co., 33, King Street, Manchester. Private company.

Northcote Shipping Company, Ltd.—Capital, £1,500, in £50 shares. Objects: Shipowners, shipbuilders, shipwrights, charterers of ships and vessels, ship insurance and share brokers, mortgagees of shipping property, ships' husbands, ship chandlers, [illegible] engineers, dealers in engines, boilers and machinery, tug owners, towage and freight contractors, shipping [illegible], carriers, [illegible], &c. Signatories:—

E. W. Jacques, 37, Side, Newcastle-on-Tyne, shipbroker.

[illegible] Newcastle-on-Tyne, shipowner.

Directors and [illegible]. E. W. Jacques. Private company.

Alaska Corporation, Ltd.—Capital, £100, in 5s. shares. Objects: Mining, working and [illegible] bitumen or natural gas, shipowners, shipbuilders, [illegible] Signatories:—

G. D[illegible], [illegible] Street, E.C., [illegible]owner.

H. G[illegible], [illegible] Road, Bexley, Worcs., company director.

W. R. Wood, [illegible] Street, E.C., merchant.

F. [illegible], [illegible] W.C., [illegible] mining [illegible]

[illegible]

[illegible]

A. Smith, [illegible], E.C., [illegible]nt.

[illegible], [illegible], [illegible], N., [illegible]

Registered [illegible] of incorporation. No one had consented [illegible] directors to November 15. Solicitors: Ashurst, Morris, Crisp & Co., [illegible], E.C. 2. Private company.

United Shipbuilders and Repairers, Ltd.—Capital £2,000, in 1,800 7 per cent. cumulative preference shares of £1 each, and 4,000 founders shares of 1s. each. Objects: Shipbuilders and repairers, shipwrights, engineers, dock owners, shipbrokers, iron and steel and brassfounders, &c. Agreement with Wally C. L. Lamot, Frans C. Frateur and Henri F. Panesi. Signatories:

W. C. L. Lamot, 17, Great Russell Street, W.C., shipbroker.
F. C. Frateur, 5, Aldebarne Road, Shepherds Bush, W., engineer.
H. F. Panesi, 19, Ormiston Road, Shepherds Bush, W., shipbuilder.

The first directors are W. C. L. Lamot, F. C. Frateur, and H. F. Panesi. Private company.

Deepwater Wharf, Ltd.—Capital, £100,000, in £1 shares. Objects: To acquire a wharf or wharves on the River Tees, with all necessary workshops, buildings, machinery, equipment and conveniences, to acquire or construct, maintain, work and use, in the United Kingdom or elsewhere, a graving dock or graving docks (with patent and other slips), pontoons, wharves, piers, quays, jetties, staithes, railways, tramways, roads, shipping places and berths, and to carry on the business of stevedores, wharfingers, storekeepers, warehousemen, lightermen, checkweightmen, master porters, forwarding agents, towage and haulage contractors, salvors, wreck removers, ship breakers, sand grabbers, ferrymen, ship and tug owners, shipwrights, shipping and chartering agents, ship chandlers, ship store dealers, shipbrokers, &c. Signatories:

Walter Furness, Royal Liver Building, Liverpool, shipowner.
David Cooke, Royal Liver Building, Liverpool, company director.

The first directors are Walter Furness and David Cooke. Qualification, £100 shares. Registered office: Royal Liver Building, Liverpool.

Aadnesen & Dahl, Ltd.—Capital, £50,000, in £1 shares. Objects: To take over the business of shipbrokers, coal exporters, shipowners and general shipping agents carried on by Ludvig Aadnesen and Harald Dahl, at Bute Docks, Cardiff. Signatories:

A. L. Pew, 97, Newcastle Road, Cardiff, accountant.
W. E. Greenslade, 7, Alfred Road, Willesden, Glam., chartering clerk.

Permanent governing directors, Ludvig Aadnesen and Harald Dahl (both Norwegians). Registered office: 7 S. Bute Crescent, Cardiff. Private company.

Thomas Welsh & Co., Ltd.—Capital, £50,000, in £10 shares. Objects: To take over the business of a West African merchant carried on by T. Welsh, as "Thomas Welsh & Co.," at Liverpool and the West Coast of Africa; also to carry on the business of merchants, shipowners, shipbuilders, charterers of ships and vessels, warehousemen, wharfingers, &c. Signatories:—

T. Welsh, Colonial House, 20 Water Street, Liverpool, African merchant.
J. Macfarlane, Mossley, Westcroft Road, Preston, manager.

The first directors are T. Welsh, J. Macfarlane and A. McNicol. Solicitor: E. V. Crooks, 14, Castle Street, Liverpool. Private company.

Ford Boat Company, Ltd.—Capital, £4,500, in £1 shares (2,500 "A," 1,000 "B," and 1,000 "C"). Objects: Constructors of and dealers in boats, skips, vessels, barges and lighters, engine and mechanical engineers, manufacturers of and dealers in naval, exploring and sporting equipments, electrical engineers, &c. Signatories:

A. E. Ford, Gresham House, Strand, W.C., boat designer and manufacturer.
F. J. Norman, 27, Islington Road, W., accountant.

The first directors are A. E. Ford (chairman) and N. S. Rudolf. Registered office: 42, North Audley Street, W.1. Private company.

Bonding & Transport Co., Ltd.—Capital, £5,000, in £1 shares. Objects: To carry on the business indicated by the title and that of wharfingers, stevedores, refrigerating and cold store proprietors, &c. Signatories:—

W. M. [illegible], Edinburgh, Coal merchant.
A. G. M[illegible], 7, Lauriston Gardens, Edinburgh, Solicitor.

The first directors are not named. Registered office: 6, Alva Street, Edinburgh. Private company.

FORTHCOMING EVENTS.

Institution of Mechanical Engineers.—Thursday, December 13, meeting at the Institution of Civil Engineers, Great George Street, Westminster, S.W., at 6 p.m. Discussion on "The Motor Vessel," introductory papers by Mr. [illegible] and Mr. A. J. Suddon.

Institution of Naval Architects.—Thursday, December 13; meeting at the rooms of the Royal Institution, Great George Street, Westminster, S.W., at 5 p.m. Discussion on "The Motor Vessel," introductory papers by Mr. [illegible] and Mr. A. J. Suddon.

NEWS PARAGRAPHS.

Leith Seamen's Institute.—It was reported at the annual meeting of the Leith Seamen's Institute, held last week, that a donation of £250 had been received from the British Sailors' Relief Fund of Canada, this being Leith's share of the sum of £70,000 raised by the people of Canada as an expression of gratitude to the British Empire Sailors.

The Future of Goole.—The adverse effect which the war has had upon the shipping trade of Goole has led to a suggestion from Mr. G. W. Townend, the president of the Goole Chamber of Commerce and Shipping, that some engineering works should be started in the town by local commercial men. He has himself offered to put £1,000 towards the idea if ten or a dozen others will do the same. He has also expressed his belief that there is a great need in Goole for a foundry and that such an industry would succeed.

Wear Commissioners' Graving Docks.—The Traffic Committee of the River Wear Commission has entered into an agreement with T. W. Greenwell & Co., Ltd., of Sunderland, to lease No. 1 Graving Dock and adjacent ground to that firm for a period of 40 years at a rent of £3,000 per annum, and to give the firm permission to enlarge that dock. Requisite public notice has been given of the Commissioners' intention to promote a Bill in the present session of Parliament giving them fuller powers as regards their graving docks, and to carry out certain works connected therewith and for other purposes.

The P. & O.'s New Fleet.—The following is the fleet of six steamships, of 23,497 tons gross, recently acquired from James Nourse, Ltd., by the Peninsular & Oriental Steam Navigation Co. and the British India Steam Navigation Co., Ltd.:—

Vessel	Tons gross	Year built.
[illegible]	[illegible]	1917
[illegible]	[illegible]	1901
[illegible]	[illegible]	1900
[illegible]	[illegible]	1900
[illegible]	[illegible]	1900
[illegible]	[illegible]	1900

Triplex Safety Glass.—An important group of New York financial and commercial men have acquired the patent rights for manufacturing Triplex safety glass for war purposes, including automobile windscreens, ships' portholes, chart tables, bridge screens, aviation goggles, aeroplane windscreens and observation panels, and many other important uses. A factory, plant and machinery are in course of construction for the manufacture of Triplex glass in America and will shortly be in operation. Meanwhile, a member of the syndicate, Mr. W. J. Finlay, who is in London, will deal with all enquiries at 1, Albemarle Street, Piccadilly, W. 1.

Wear Shipyard Extensions.—The River Wear Commissioners have sanctioned the doing of certain work in connection with Swan, Hunter and Wigham Richardson's shipyard at Southwick. It is intended to construct a fitting-out quay, with a frontage of 56 ft., a gangway to connect the quay for the shipyard and a dolphin about 100 ft. to the west of the quay; also, to construct a similar quay and shipbuilding berth at the west end of the shipyard, with a frontage of about 325 ft. to the river, the smaller portion of which extension, about 75 ft. long, is to be constructed as a fitting-out quay and the larger portion as a launching quay; and also to embank the foreshore of the exet behind the proposed quays.

Shipyards at Dublin.—In the House of Commons last week Mr. Alfred Byrne asked the Parliamentary Secretary to the Shipping Controller if any report had been or would be made on the facilities for a Government shipbuilding yard at Dublin; if he was aware that there were none with all facilities available at North Wall; and if he would say whether the Government would give to Dublin workers a portion of the shipbuilding in return for the war taxation they were called upon to pay. Dr. Macnamara in a written reply stated: The resources of Dublin with those of other shipbuilding centres throughout the United Kingdom have been thoroughly investigated with a view to increased output of merchant tonnage. There is not at present any question of establishing a National shipyard in Ireland, as it is considered that in that country the object can best be obtained by improving existing yards and encouraging private enterprise. A proposal for extending one of the existing private shipyards in Dublin is now receiving consideration. As regards Ireland generally, every effort will be made to allocate to Colonial yards as much work as can be advantageously undertaken by them.

Illegal Acts of Submarines.—The Spanish Association of Captains and Officers of the Merchant Marine has refused to take part in an international conference at Copenhagen to discuss the illegal acts committed by submarines against ships' crews on the ground that the Spanish Government has already protested against such illegal acts.

Vessels under Construction in Canada.—According to the *Canadian Engineer* (Toronto), 74 vessels of 126,949 gross tons are being built in Canadian shipyards. Of these, 25 vessels with a tonnage of 22,525 tons are being built on the Atlantic coast, 30 with a tonnage of 45,234 tons on the Great Lakes, and 19 with a tonnage of 59,190 tons on the Pacific Coast.

Aberdeen Harbour Workers' Wages.—At a recent meeting of Aberdeen Harbour Board it was decided to grant an increase of wages to the workers in the employment of the Board, and the Wages Committee were instructed to prepare a report on the wages of the employees. The increase will apply to all men who are in receipt of 80s. and under per week, the advances to date from the beginning of October last.

Royal Mail Steam Packet Company.—A Reuter message from Buenos Ayres states that the new offices of this company were opened recently by Sir R. Tower, the British Minister, who delivered an address. Señor Aldao, the President of the Argentine branch of the company, touched upon the success attending recent efforts to cope with the German submarines. The French and Russian Ministers and the élite of the worlds of commerce and finance were present at the function.

A Sunk Food Ship.—Mr. Houston put a question in the House of Commons on Tuesday regarding the loss of the steamer *La Blanca*, 7,479 tons gross. Sir L. C. Money said that the vessel was taken into one port on account of engine trouble. She was afterwards sent to another port to discharge cargo and was sunk before reaching it. The disposition for her safety was in the hands of the Admiralty and she was throughout convoyed or protected by Admiralty vessels. The cargo consisted of 3,910 tons meat and 400 tons of other commodities. Sir Leo denied as absolutely untrue a report that a food ship having entered an East coast port recently was sunk after having left it.

Amalgamation of Two Trade Unions.—After a long conference, held recently in London, of the executive councils of the Dock, Wharf, and Riverside Workers' Union and the National Union of General Workers (formerly known as the Gasworkers' Union), a scheme of amalgamation of the two organisations was adopted. Matters of detail have been submitted to the Amalgamation Committee of the two forces to give effect to the alliance, which will have a membership of over 450,000. The complete scheme, it is hoped, will be in the hands of the members of the unions for their final vote in a few weeks. Among those who took part in the conference were Mr. Ben Tillett, M.P., Mr. Will Thorne, M.P., and Mr. J. R. Clynes, M.P. The officials and staffs of both unions are to be taken into the service of the amalgamated union, the title of which will be settled later.

Shipping of North China Ports.—The tonnage of steamers entered and cleared at the various ports of North China during 1916 shows a marked decrease from the figures of 1915, with the exception of Chinwantao, which shows an increase of 134 vessels and 36,543 tons. The largest decrease was at Newchwang, where 292 fewer vessels and 440,595 tons less were entered and cleared than in 1915. The following gives the number and tonnage of steamers entered and cleared during 1916:—

Ports	No.	Tonnage
Antung	[illegible]	[illegible]
Dairen	1,411	[illegible]
Newchwang	684	724,414
Chinwantao	1,024	1,377,870
Tientsin	[illegible]	[illegible]
Chefoo	3,141	[illegible]

Facilitating American Shipbuilding.—To facilitate the execution of the Emergency Fleet Corporation's shipbuilding programme a conference has been held at Washington between representatives of the Shipping Board, the Department of Labour, the American Federation of Labour, the Navy Department, and the Atlantic Coast Shipbuilding Association, at which the following important points were decided: The adjustment and standardisation of shipyard wages on the Atlantic Coast; the collection, tabulation, and regulation of labour for the Emergency Fleet corporation; and for increasing the efficiency, proper ordering, priority, and delivery of shipbuilding materials; the co-ordination and co-operation by the United States Navy and the United States Shipping Board with the Atlantic Coast shipbuilders; and the adoption of an equitable policy of adjustment so as to conserve the interests of shipbuilders.

The Mine Danger.—Danish owners are organising a scheme for dealing with the mine peril, which danger will endure for some time after the war. A large number of small wireless telegraph sets are to be installed on vessels, which will spread news of drifting mines and participate in their destruction.

Greek Shipowners' Loan.—Shipowners of the Piræus have decided to grant the Greek Government a loan on the security of the taxation on extra war profits. Thirteen shipowners have already promised £800,000, and have telegraphed to Greek shipowners in London and Paris, whose participation is regarded as certain.

New Swedish Yard.—A company recently established in Stockholm, with a capital of £55,000, is to build a new yard near the city (the third or fourth new one in the district) for the construction of medium-sized sea-going vessels. Two shipways and a floating dock will be provided at first, and for the present wooden vessels will be constructed.

Howaldtswerke, Kiel.—It has been decided to raise the capital from £343,000 to £490,000. The new shares are being taken over by a syndicate under the Deutschen Bank and will be issued at 120 per cent. Prospects are good, and there are plenty of orders in hand. The new capital will be applied to extending the works and bringing the equipment up to date.

Canadian Shipbuilding.—It is estimated that contracts for nearly 200 ships are now in hand. The Imperial Munitions Board has placed orders for 37 steel and 47 wooden vessels, divided between the Atlantic and Pacific Coasts, whilst for private account 44 steamers are being built at Atlantic coast ports, 45 on the Great Lakes, and 18 on the Pacific, aggregating 155,691 tons gross. Great difficulty is, however, experienced in obtaining steel.

Middlesbrough's Super-Ironmasters.—There would appear to be no fear in the minds of the directors of Dorman, Long & Co., Ltd., as to the future of the iron and steel trade, for that firm is making one great stride after another. Two years ago they absorbed Walker, Maynard & Co., whose possessions comprised six blast furnaces and a battery of by-product coke-ovens near Redcar, a freehold wharf on the Tees, and an ironstone mine in Cleveland. A few months ago, Mr. A. J. Dorman announced that they had in hand the construction and equipment, at a cost of about two millions sterling, of new steelworks at Redcar, works which would include a 400-ton mixer, 10 large steel furnaces, a cogging mill and two large mills for the manufacture of steel plates. Several of these new furnaces are now in operation. They have now absorbed the undertakings of Sir B. Samuelson & Co., Ltd., whereby they become proprietors of four Durham collieries, eight more blast furnaces, another large coke-oven plant, ironstone mines and the Newport Ironworks. The acquisition should place Dorman, Long & Co., Ltd., in a position to supply easily all the pig iron required for the new steelworks at Redcar.

Seventy per cent. Loss on Freight.—*Hansa* presents the following statement of costs incurred by a Goteborg steamship on a journey between the west coast of Sweden and the east coast of England in the summer of 1917:—

	£ s. d.	£ s. d.
Costs in port—departure	150 0 0	
Norwegian pilot "outward"	41 10 0	
		191 10 0
Costs in port—arrival	265 0 0	
Consulate fees, per cent.	96 14 0	
		361 10 0
War insurance, cost on Goteborg	5,280 0 0	
Extra [illegible] crew	170 0 0	
		5,450 0 0
Freight commission, 2½ per cent.	58 10 0	
Stevedoring [illegible]	1,150 0 0	
Ship extra [illegible] days in harbour at £25	485 0 0	
		1,693 10 0
Total		7,696 10 0
Freight		4,550 0 0
Loss		£3,146 0 0

OFFICIAL NOTICES AND SHIPS FOR SALE.

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(Thos. Pinkney, S. Renny Pinkney, David R. Pinkney).

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BORWICK & SONS,
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"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and Type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year	Machinery and builders.	Remarks.
Ayuthia, ss. (single dk.)	1,135 gr. 694-net 1,350 d.w.	231½′ × 34′ × 13½′ (15′)	Bengal-Assam S.S. Co., Calcutta, to buyers not stated	Greenock & Grangemouth Dockyard Co., Grangemouth (1904)	17, 28½, 46 × 33 (Cooper & Greig, Dundee)	Price about £65,000.
Betwa, ss. (shelter dk.)	3,800 gr. 2,340 net	360½′ × 46½′ × 27½′	Nourse Line, London, to P. & O. Co., London	C. Connell & Co., Glasgow (1917)	24½, 41, 68 × 45 (D. Rowan & Co., Glasgow)	
Chenab, ss. (shelter dk.)	3,549 gr. 2,157 net	350½′ × 44½′ × 27½′ (24′)	Nourse Line, London, to P. & O. Co., London	Cammell, Laird & Co., Birkenhead (1911)	24½, 40, 68 × 45 (D. Rowan & Co., Glasgow)	
Ganges, ss. (awning dk.)	3,497 gr. 2,149 net	349½′ × 44′ × 19½′	Nourse Line, London, to P. & O. Co., London	C. Connell & Co., Glasgow (1906)	24½, 40, 68 × 45 (D. Rowan & Co., Glasgow)	
Megna, ss. ...	5,603 gr. 3,582 net	423¼′ × 56′ × 28½′ (25′ 6″)	Nourse Line, London, to P. & O. Co., London	Russell & Co., Pt. Glasgow (1916)	27, 45, 74 × 51 (D. Rowan & Co., Glasgow)	—
Mutlah, ss. (awning dk.)	3,499 gr. 2,156 net	349½′ × 44′ × 19½′ (24′ 1″)	Nourse Line, London, to P. & O. Co., London	C. Connell & Co., Glasgow (1907)	24½, 40, 68 × 45 (D. Rowan & Co., Glasgow)	
Sutlej, ss. (awning dk.)	3,549 gr. 2,170 net	349′ × 44½′ × 19½′ (24′ 1″)	Nourse Line, London, to P. & O. Co., London	C. Connell & Co., Glasgow (1908)	24½, 40, 68 × 45 (D. Rowan & Co., Glasgow)	
Dalblair, ss. ...	4,661 gr. 2,939 net 7,600 d.w.	390′ × 52½′ × 20½′ (23′ 10″)	Alliance Shipping Co., Glasgow, to Wm. Thomson & Co., Leith	Scotts' S.B. & Eng. Co., Greenock (1906)	26½, 44, 72 × 48 (Scotts' S.B. & Eng. Co.)	—
Favorita Clara, ss. (single dk.)	512 gr. 262 net 550 d.w.	152′ × 29½′ × 11½′ (11′)	S. Ferrando, B. Aires, to buyers not stated	G. Seebeck A.G., Bremerhaven (1907)	11, 20 × 15½ (G. Seebeck A.G.)	
Favorita Doña Catalina, ss. (single dk.)	496 gr. 259 net 500 d.w.	145½′ × 29½′ × 11½ (10′ 9″)	S. Ferrando, B. Aires, to buyers not stated	G. Seebeck A.G., Bremerhaven (1906)	11, 20 × 15½ (G. Seebeck A.G.)	Price about £110,000.
Favorita Santiago Fernando, ss. (single dk.)	462 gr. 235 net 450 d.w.	130½′ × 29½′ × 11½′ (10′ 10″)	S. Ferrando, B. Aires, to buyers not stated	G. Seebeck A.G., Bremerhaven (1905)	10½, 20½ × 15½ (G. Seebeck A.G.)	
John Crerar, ss. (single dk.) (re-named **Fouras**)	1,550 gr. 955 net	241′ × 41′ × 15½′	Gt. Lakes & St. Lawrence Transportation Co., Duluth, to Soc. Maritime Nationale, Havre	Chicago S.B. Co., Chicago (1903)	15, 25, 42 × 30 (Chicago S.B. Co.)	Price about £130,000.
Rayford, ss. (single dk.) (ex *Blanche Rock*)	471 gr. 186 net 640 d.w.	162′ × 25½′ × 11½′ (12′ 9″)	"Rayford" Shipping Co., Glasgow, to buyers not stated	Ailsa S.B. Co., Troon (1894)	17, 42 × 30 (Muir & Houston, Glasgow)	Price about £20,000.
T. G. Hutton, ss. (single dk.)	703 gr. 423 net 1,000 d.w.	180′ × 28′ × 13½′ (13′ 11″)	H. A. Cochrane, Sunderland, to buyers not stated	Short Bros., Sunderland (1891)	15½, 25, 41 × 27 (W. Allan & Co., Sunderland)	—
Sakura Maru, ss.	3,058 gr. 1,192 net	340½′ × 42½′ × 21½′	Imperial Marine Association, Tokio, to buyers not stated	Mitsu Bishi Dockyard & Eng. Works, Nagasaki (1908)	3 steam turbines (Mitsu Bishi Dockyard & Eng. Works)	Price about £180,000.
Soyo Maru, ss. (ex *Hermione* (re-named **Nucula**)	4,614 gr. 2,807 net 6,750 d.w.	370′ × 48½′ × 28½′	Toyo Kisen Kaisha, Yokohama, to buyers not stated	Sir W. G. Armstrong, Whitworth & Co., Newcastle (1906)	25, 42, 70 × 48 (Wallsend Slipway Co., Ltd., Newcastle)	—
Verdande, ss. (single dk.)	1,610 gr. 966 net	244½′ × 37½′ × 15½′	Schjelderup & Schjott, Bergen, to buyers not stated	Bergens Mek. Værks, Bergen (1914)	18, 29, 49 × 33 (Bergens Mek. Værks)	—

SHIPPING SHARE MARKET.

The stock and share markets have again been very active, and prices are in most instances harder, with continued buying from the northern counties. Royal Mail ordinary stock has touched 125, a rise of 10 points on the week, and there have been numerous dealings at over 124. This is easily the highest price recorded during this year, and justifies all the warnings given by Sir Owen Philipps to the stockholders two years ago when the price had fallen to 76, not to be disheartened by the position. The Royal Mail financial year coincides with the calendar year, and the accounts are not due for another six months. There has been exceptional activity in Cunard shares at over 80s. Mercantile Steamship shares continue to be bought despite the higher price of 25 which the £5 shares have recently attained. Last year's accounts showed a very strong position, and as the reserves were then very considerably strengthened the market is taking the view that another bonus will be paid out of profits for the current year in addition to the dividend of 30 per cent. Prince Line shares have this week changed hands at £6, and for Clan Line £10 shares in which ten bargains were marked on one day this week there is a persistent demand at as high as 55, which is just double the price ruling in the early part of the year. There are therefore many indications that shipping investors still regard the immediate outlook with no misgiving in respect to the profits of the various shipping companies. It is necessary, however, for investors to exercise some caution in buying ordinary shares at a high premium unless they are the issues of established companies. Some rash investors who purchased the ordinary shares of the London-American Maritime Trading Company at 30s. about two years ago when a market was being made in the shares on the strength of a first dividend of 27 per cent., have received a rude shock this week in the announcement that the dividend is reduced to 12 per cent., the profits having fallen from £167,866 to £87,517. Readers of these notes will not be (or should not be) among those who have sustained a loss of income on this account, but it emphasises the necessity for care to be exercised in buying shares at a premium on the sole strength of a war-time dividend. Peninsular & Oriental Steamship stocks have been steady on the issue of the report to which we refer elsewhere. Shipbuilding companies' issues have again received considerable attention. It is stated that the companies have four years' orders in hand.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
African S.S.	20	33–23½	10	7½	28	
Allan Line ... ... Deb.	100	—	4	4½	92	
Anchor Line ... Cum. pref.	10	9½–9⅛	5⅝	5⅝	9¼	
Do. ... ... Deb.	Stk.	105⅝–102⅜	4⅜	4⅜	103	
Argentine Nav. ... Cum. pref.	1	19/6–11/–	Nil.	Nil.	23/3	
Do. ... ... Ord.	1	14/6–5/6	Nil.	Nil.	16/9	– -/6
Australasian Un. S. Nav. Deb.	Stk.	83⅜–80⅜	4	5	80	
Belfast Steam ... ... "A"	10 (5pd.)	—	5	5	5	
British & Argen. Nav. ... Deb.	Stk.	87½–82½	4½	5½	81	
British India Nav. ... Deb.	Stk.	94⅛–88⅛	4½	5⅛	83	
British S.S. Invest. Trust Def.	Stk.	357–190	50*	11½	425	
Do. ... ... Pref.	Stk.	108–105½	6	5⅝	104	
Do. ... ... Deb.	Stk.	79–77⅞	4⅜	6⅛	74	
Cairn Line ... ... Deb.	Bds.	99–88	5	5⅝	90½–91	
Do. ... ... Ord.	1	—	20†	8	50/–	
Clan Line ... ... Ord.	10	32½–22½	2/6	5	50	
Court Line ... ... Ord.	£1	42/–26/–	20	13½	39/6	+ -/6
Cunard SS. ... ... Ord.	1	101/–68/–	20*	5	81/6	+ 1/6
Do. ... Cum. pref.	Stk.	95–89	5	5½	87	
Do. ... ... Deb.	Stk.	99½–93⅜	4½	4½	99½	
Elder Line ... ... Deb.	Stk.	97⅜–89⅜	4½	4⅝	103	
Elder Dempster ... Cum. pref.	1	20/6–18/1	5⅞	6⅛	18/–	
Do.	Stk.	92⅜–88⅜	5	5⅔	87	
Ellerman Lines ... Pref. Ord.	10	9½–9⅛	8⅛	8⅝	9¼	
Do. ... Guar. pref.	10	9⅛–8⅞	4⅜	5⅛	8⅝	
France Fenwick ... Cum. pref.	5	98⅞–92/6	5⅝	6⅛	87/6	
Furness, Withy ... Ord.	1	61/3–34/3	20*	9⅝	59/–	+ 5/–
Do. ... Cum. pref.	10	9½–7⅞	5	6⅜	8¾	
General Steam Nav. ... Ord.	7½	12⅜–8⅛	15	7⅞	22/6	
Do. ... ... Pref.	8	7⅞–6⅜	6	7⅜	16/–	
Houlder Line ... Cum. pref.	5	83/9–67/6	5⅓	6⅔	80/–	
Do. ... ... Deb.	Stk.	—	4½	4⅝	93	
Houlder Bros. ... Cum. pref.	5	—	5⅓	6⅔	4	
Do. ... ... Deb.	Stk.	—	4⅜	5⅜	82	
India Gen. Nav. & Rly. ... Ord.	10	12–8⅜	6	5⅜	11xd	
Ind. China N. ... Pref. Ord.	5	5⅞–90/–	6	6⅝	93/–	+ 2/6
Irrawaddy Flotilla	40	—	15	5⅞	116	– 2/3
Khedivial Mail ... ... Ord.	1	37/–10/–	25	12½	37/3	
Do. ... ... Pref.	5	77/6–60/6	5⅜	7⅛	75/–	
Do. ... ... Deb.	Stk.	94⅛–87⅛	4½	4⅝	95	
King Line ... ... Ord.	1	—	16*	9⅛	40/–	– 1/6
Lamport & Holt ... Cum. pref.	£1	20/9–18/9	6	6	19/3	– -/1½
Leyland (F.) ... Cum. pref.	10	8⅛–6½	5	6¼	8	
Mercantile SS.	5	18⅛–12	40	8	24½	– ⅜
Do. ... ... Pref.	1	20/1⅜–20/–	—	6½	15/–	
Moor Line ... ... Ord.	10	—	30	13½	22⅜	
Nelson Steam Nav. ... Deb.	100	98⅜–97⅜	5	5⅛	98⅜	
New Zealand ... ... Ord.	£10	—	8	2⅜	32½	
Do. ... ... Deb.	Stk.	90⅜–88	4	4⅜	88⅜	
Nitrate Producers SS. ... Ord.	5	25⅛–18	30	6¼	24⅜	
Do. ... Cum. pref.	5	—	5	5	5	
Oceanic Steam. Nav. ... Deb.	100	99–95⅛	4⅜	4⅝	96	
Orient.Stm.Nav.Co. Cum. pref.	10	9⅜–9⅛	5	5⅜	9	
Do. ... ... Deb.	100	98–91⅜	4⅜	5⅛	88	
P. & O. S. N. ... Cum. pref.	100	100–91	5	5⅝	93	
Do. ... ... Def.	100	349–270	18	5⅜	338⅛	+ 3⅛
Do. ... ... Deb.	Stk.	71–69	3⅜	5⅛	63	
Prince Line	1	95/–26/–	30	5⅝	108/9	
R.M.S.P. ... ... Ord.	100	134⅛–97⅞	7	6	123⅛	+ 7
Do. ... ... Pref.	Stk.	86⅛–76⅝	5	6	85	+ 1
Do. ... ... Deb.	Stk.	89–86	4⅜	5⅛	89	
Shaw, Savill & Alb. Cum. pref.	5	9⅝–8⅜	5⅛	5⅞	8⅝	
Shell Transport ... ... Ord.	1	6–4⅜	35	6	5⅞	
Do. ... Cum. pref.	10	10⅛–9	5	5⅓	9	
Sutherland SS. Co. ...	£1	69/6–41/6	30	8½	70/–	
Union-Castle SS. ... Cum. pref.	10	7⅛–7	4⅜	6	7⅜	
Do. ... ... Deb.	Stk.	92⅜–86⅜	4	4⅝	87	
West Hartlepool ... ... Pref.	10	8⅛–7⅜	5⅜	7⅜	7⅜	

INSURANCE.

Alliance	20 (2'4 pd.)	10½–8⅜	12/–	7	9⅜	– 1/16
Indem. Mutual Marine	15 (3 pd.)	13⅞–9½	2/–	5	20½	
London Assurance	25 (12½ pd.)	52⅜–42½	20	6	58	
Marine Insurance	25 (15 pd.)	36⅛–33⅜	45/–	6	55⅜	
Merchants' Marine Insurance ...	10 (2½ pd.)	7⅛–71/3	10	6	9⅜	– 1/16
N. British & Mercantile Ord.	25 (6¼ pd.)	34⅜–29	40/–	6⅔	34	– 3/16
Phœnix Assurance	10 (1 pd.)	7⅛–6⅛	40	7	7 1/16	
Royal Exchange Assurance ...	Stk.	189½–181	10	4½	226	
Sea Insurance	10 (2 pd.)	19⅜–19⅛	10	6	27	
World Marine, Limited ...	5 (2 pd.)	61/3–35/–	5	4⅜	6	

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
Babcock & Wilcox... ... Ord.	1	64/6–47/10½	15	4⅔	65/–	– 1/3
Baldwins ... Cum. pref.	1	1⅛–1	5½	5⅜	20/–	
Do. ... ... Deb.	Stk.	87⅜–86⅛	4½	5⅛	84	
Bayliss, Jones ... Cum. pref.	1	—	5	7⅛	1⅛	
Bell Bros. ... ... Cum. pref.	10	10⅜–9⅝	6	6	10	
Do. ... ... Deb.	Stk.	80–78⅜	5	6⅜	75⅜	
Bessemer (Henry) ... Ord.	1	29/–26/–	12½	7⅜	34/6	
Bockow Vaughan ... Ord.	1	25/10½–18/–	11	7⅞	29/–	– -/6
Do. ... ... Cum. pref.	20	19–18	5	5⅜	17	
Cargo Fleet Iron ... ... Ord.	1	23/3–13/10½	3	3⅜	24/–	
Do. ... ... Deb.	100	86⅛–84	4½	5⅜	83	
Consett Iron Co. ... ... Ord.	1	89/4½–65/3	50	11	90/–	
Dominion Iron & Steel	Bds.	83–78	5	6⅓	86½	+ 11½
Dorman, Long ... ... Ord.	1	36/–22/3	8†	—	45/4½	– 1/1½
Do. ... ... Deb.	Stk.	97⅜–97	4½	—	73	
Ebbw Vale Steel & Iron ... Ord.	1	28/7½–19/–	12½	9⅛	29/–	
Guest, Keen & Nettefids ... Ord.	1	71/3–60/–	15*	3⅜	87/–	
Do. ... ... Cum. pref.	5	5¼–5⅛	5	4⅛	5⅛	
Do. ... ... Deb.	Stk.	82⅜–80½	4	5⅛	79	
Hadfield's Steel Foundry Ord.	1	82/6–69/–	30	5⅛	105/–	
Dobotson Bros.	5 (4 pd.)	8–6	7½	4⅛	6¼	
Jessop (W.) & Sons	5 (4 pd.)	9–8	15*	6⅔	9½	
Lanarkshire Steel Cum. pref.	10	—	5	7⅛	7	
Lysaght (J.) ... Cum. pref.	1	22/7½–20/3	6	6	20/–	
Do. ... ... 2nd pref.	1	21/1⅛–21/–	6	6	20/–	
Manganese Bronze ... Ord.	1	—	6	11	1⅛	
Do. ... ... Cum. pref.	1	—	6	8	¼	
North-Eastern Steel ... Deb.	Stk.	—	4½	—	—	
Palmers Ship & Iron "A" ...	1	12/6–9/–	Nil.	Nil.	13/4½	+ -/4½
Scott (Walter) ... ... Ord.	1	26/3–17/9	15	10	30/–	
Do. ... ... Pref.	1	16/10½–16/3	6	7⅜	19/–	
Sheffield Forge ... ... Ord.	1	—	15	4½	66/–	
Shelton Iron & Steel ... Ord.	1	20/4½–15/–	7½	6	23/4½	– -/10½
Do. ... ... Deb.	100	94–92½	5	5⅜	91⅜	
S. Durham Steel & Iron ... Ord.	1	37/6–27/–	15	4⅞	38/6	– 3/6
Do. ... ... Cum. pref.	1	21/–19/–	6	6	20/–	
Do. ... ... Deb.	Stk.	82–80	4½	5⅛	80	
Steel Co. of Scotland ... Ord.	10	—	10	10	12/1/–	
Stewarts & Lloyds Pref. ord.	10	18⅜–17	10	6⅛	16	
Do. ... ... Cum. pref.	10	—	6	6¼	13⅛	
Stone (J.) ... ... Cum. pref.	10	—	5	6⅓	8	
United States Steel	100$	144⅞–83⅛	7	7⅛	101⅛	
Do. ... Cum. pref.	100$	128⅛–112⅜	7	6	113⅞xd	
Vickers Ltd. ... ... Ord.	1	40/3–33/6	12½	5⅛	42/–	– 2/–
Do. ... ... Pref.	Stk.	93–85	5	6	82	
Do. ... ... Deb.	Stk.	83–75	4	5⅜	77½xd	
Weardale Steel ... Def. ord.	1	34/– 19/1⅔	19½	13⅓	31/–	
Do. ... ... Cum. pref.	1	23/6 –17/6	6	5	24/–	
Do. ... ... Deb.	Stk.	70⅜–69½	4	6⅓	64⅜	
Workington Iron & Steel Ord.	1	24/3–14/3	10	6⅔	27/10⅔	– 1/1⅔

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Armstrong, Whitworth ... Ord.	1	43/–34/6	12½	5⅞	42/1⅔	– 1/10⅔
Do. ... ... Cum. pref.	5	75/–67/6	4	5⅔	69/–	
Do. ... ... Deb.	Stk.	80⅛–75	5	6⅔	77	
Beardmore (W.) ... ... Deb.	100	99–92	4⅔	5	91	
Brown (John) ... ... Ord.	1 (15s. pd.)	27/3–20/6	12½	7⅛	28/–	
Do. ... ... Cum. pref.	10	10–5⅜	5	5⅓	8⅞	
Cammell Laird ... ... Ord.	5	7–98/–	10	7⅛	7	
Do. ... ... Cum. pref.	5	88/–76/3	5	6⅔	82/6	
Do. ... ... Deb.	100	93½–85	4⅓	5⅓	84	
Dunlop (Jas.) ... ... Ord.	1	19/7½–13/4½	10	9⅔	22/7½	+ 1/1½
Do. ... ... Cum. pref.	1	17/1⅜–16/4½	6	7⅛	17/6	
Fairfield Shipbldg Cum. pref.	10	8⅜–8⅛	6	7⅛	8⅜	
Fleming & Ferguson ... Ord.	10	—	10	7	14⅜	
Gray (Wm.) ... ... Deb.	100	100⅜–99⅜	4⅜	4⅜	100⅜	
Hawthorn (R. & W.) Leslie Ord.	10	15⅛–14	12½	5	25⅜	+ ⅜
Henderson (D. & W.) Cum. pref.	1	—	5	9	9/6	
Richardsons Westgarth ... Ord.	1	7/9–2/10½	Nil.	Nil.	9/6	
Do. ... ... Cum. pref	1	18/7½–8/–	Nil.	Nil.	18/3	
Do. ... ... Deb.	Stk.	69–67⅛	4½	6⅔	66	
Simons (W.) ... ... Cum. pref.	10	—	5	5	9⅛	
Swan, Hunter & W. R. ... Ord.	1	35/6–26/–	12½	6⅓	50/–	+ 2/6
Do. ... ... Cum. pref.	1	18/9–17/–	5	5⅔	17/–	
Do. ... ... Deb.	Stk.	82–80⅜	4⅛	5⅛	78	
Thornycroft (John I.) ... Ord.	1	38/9–21/9	17½	8⅓	40/–	
Do. ... ... Cum. pref	1	18/6–16/3	6	6⅔	18/7⅛	+ -/7⅛
Do. ... ... Deb.	100	95⅛–88	5	5⅔	85	
Wallsend Slipway ... ... Ord.	1	2–1⅛	10	5	2	
Do. ... ... Cum. pref.	1	1–1	5	5	1	

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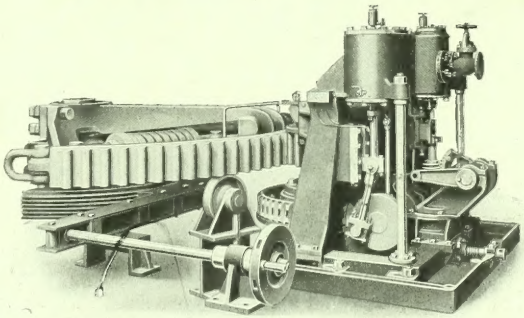

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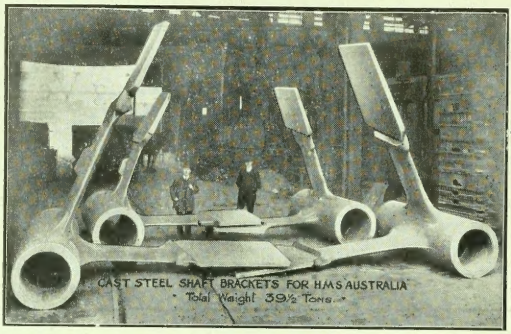

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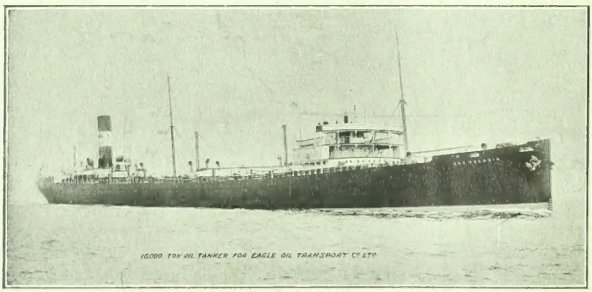

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